

This Week in The Iron Age

JULY 11, 1940

VOL. 146 NO. 2

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Member, Audit Bureau of Circulations
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Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, \$6.00; Canada, \$8.50; Foreign, \$12.00 a year. Single copy, 25 cents. Annual Number \$1.00. Cable Address, "Ironage, N. Y."

Owned and Published by
CHILTON COMPANY
(Incorporated)

Publication Office
Chestnut and 56th Sts.,
Philadelphia, Pa.
U.S.A.

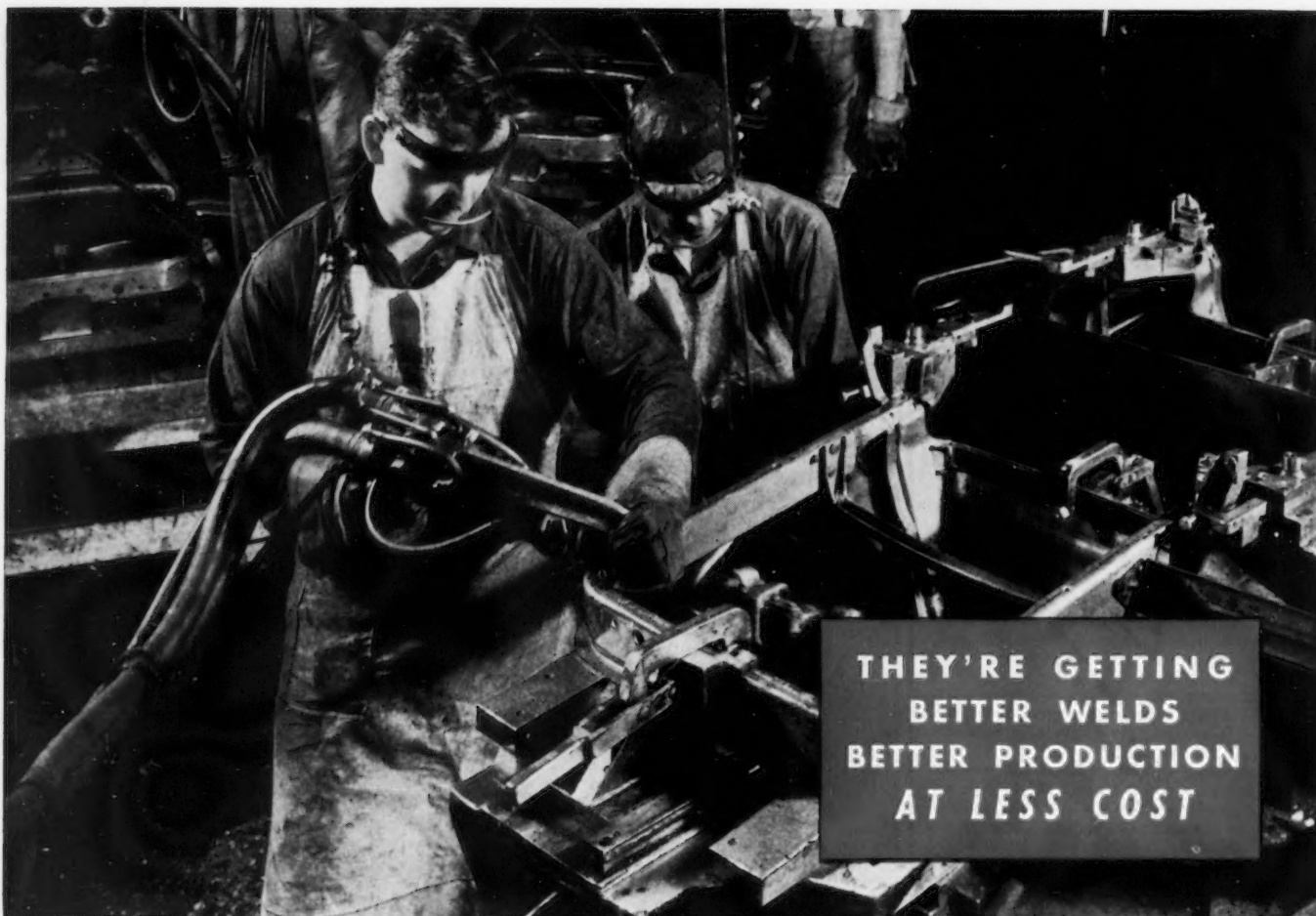
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FIG. 1—Cast steel body for a small (2 in.) valve.

Steel Valve Castings

By J. J. KANTER

Research Metallurgist, Crane Co.,
Chicago

Modern valve castings of steel are characterized by high strength and dependability unheard of a few years ago. This article describes the production of such castings, and their metallurgy, testing and performance

MODERNIZATION in the methods of producing steel castings makes possible highly dependable pressure tight castings for valves and fittings in small sizes which, by former production methods, were considered impracticable. The engineer, having but a casual acquaintance with the art of the steel founder, might suppose certain limitations for steel castings, which in reality have been overcome through the application of scientific design, molding, composition, melting, pouring, heat treatment, and inspection. Intensive study upon, not any single one, but all of these factors has contributed to the successful production of these difficult pressure castings which are dependable in every regard for severe conditions of high temperature and high pressure service.

When the operating temperatures employed in steam power plants commenced to exceed 550 deg. F. a generation ago, the production of steel castings for valves and fittings received its first impetus. Until that

time, gray iron had been a perfectly satisfactory material for steam valves and fittings, but when operating temperatures approached and exceeded 550 deg. F., weakening due to "growth," lack of ductility, and the lack of shock resistance of the gray iron limited its use. For the loads imposed by the high pressures accompanying superheated steam, the use of steel became imperative. Today steel castings are used to contain steam at temperatures up to 1000 deg. F., and in oil refineries at even higher temperatures, as well as being exposed to corrosive vapors.

A considerable development took place in the endeavor to make steel castings to meet the severe demands of high temperature pressure piping installations. The traditional methods, successful for ages in the founding of gray iron, were inadequate when steel had to be used instead. Entirely new methods of molding, as well as gating, had to be explored. There was the necessity of using large risers, often comprising more weight than the net

casting itself, to successfully adapt the more viscous and shrinkable steel in the job of making sound and pressure tight castings. Entirely new molding sands and core materials also had to be employed.

In the making of pressure steel castings, the foundryman had to overcome objectionable shrinkages in complicated sections which seldom gave trouble where gray iron had been the metal with which he was working. Much experience, however, has enabled the steel founder to lay down certain principles of design, which, if intelligently followed, will enable him to make castings which meet every requirement for soundness and strength.

Controlled directional solidification has come to be the scientific steel founders byword in successfully making high grade pressure vessels. In short, this implies the principle of feeding the molten steel to the mold in such a manner that the lighter and "thin walled" portions fill and solidify first, so as to permit the heavier sections, for instance, flanges, to act as reservoirs for feeding molten steel during their volume contraction. The risers, in turn, serve as the reservoir of molten steel to supply the finally solidifying heavy sections. Risers, containing the final shrinks may then be removed from the finished castings in a manner similar to that employed in removing the discard from the top of a steel ingot containing the "pipe."

If this solidification principle is not fully worked out in the design of the

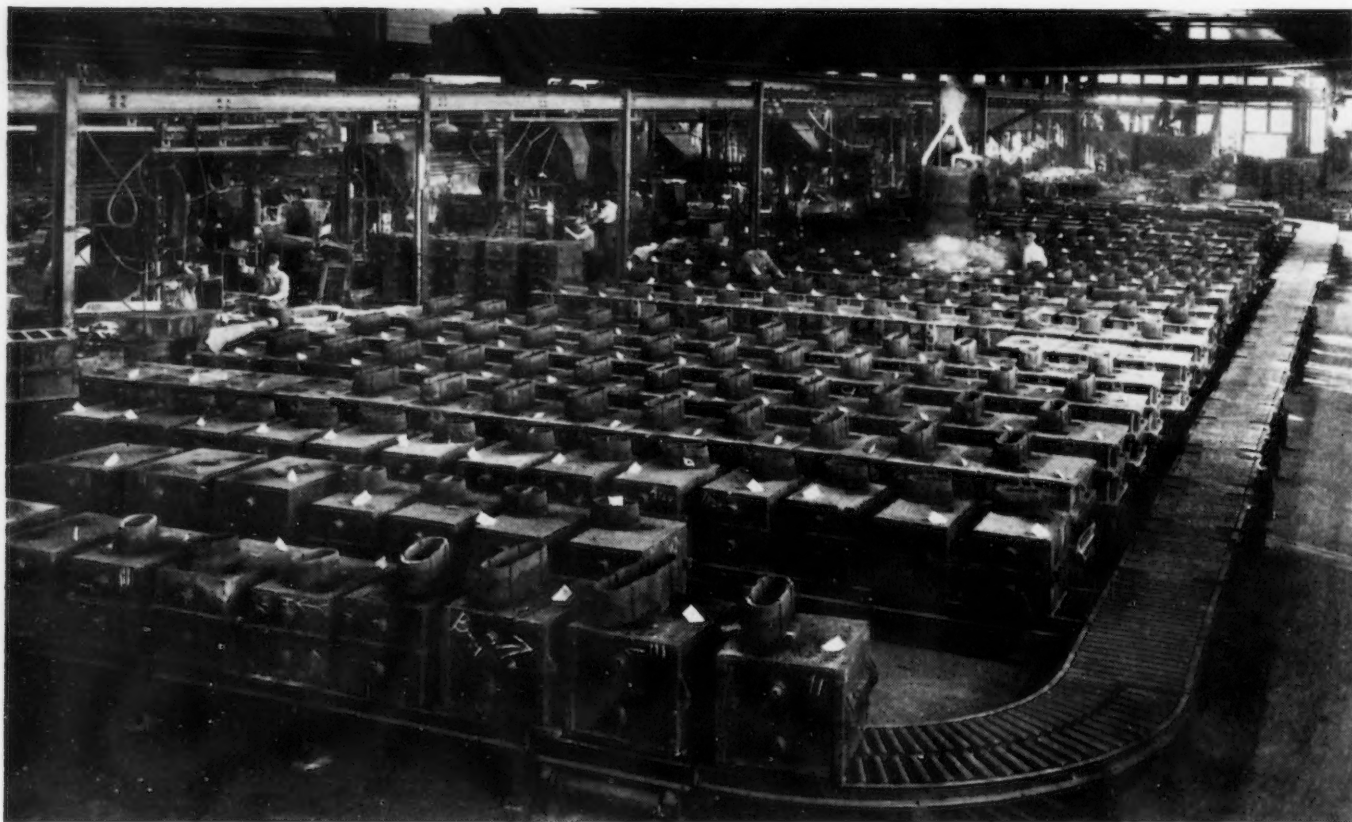


FIG. 2—A modern molding and pouring floor in a steel foundry.

casting and the planning of the mold, the molten steel is likely to have access to certain heavy section only through light section, which in freezing first, "starve" the heavy section. The result then is that heavy sections solidify without feeding and serious internal shrink cavities may result. Thanks to much study, testing, and inspection in this regard, the modern steel casting can be insured against serious internal flaws. The steel founder has realized that his is an art entirely apart from that of the traditional gray iron founder. Perhaps some of the prejudice and distrust of steel castings may be due to early experiences before their manufacture developed to the present state of dependability.

Until quite recently it had not been considered feasible to make valve body castings in the smaller sizes—2 in. and smaller. One of the primary reasons for the reluctance of steel founders in attempting the smaller sizes of these pressure castings was the difficulty in maintaining the steel hot enough to be fluid throughout a pour, so as to insure that every last casting, with its thin wall sections, would be free of shrinks, cold shuts, cracks, and other damaging defects. As a result, many manufacturers have attempted to adopt steel forgings for certain applications for which steel castings would naturally be better adapted. Diligent efforts were, therefore, directed toward the

problem of making good small steel pressure tight castings on a mass production basis. Since steel was the only metal which could be found having the requisite properties to meet the services for which high pressure valves must be qualified, not only from a technical standpoint but from an economical one as well, this left no other choice of material.

Perhaps the best solution of the problem of manufacturing small steel pressure castings has been found through the use of high frequency induction melting. Electric arc furnace melting has long been a widely used practice in the manufacture of pressure castings. While castings made by means of the electric arc and open hearth processes have been recognized as excellent products, these melting processes are used economically only for heats which become too large to permit of the pouring of many small molds at a uniformly high enough temperature.

It is necessary that each mold be poured from steel at a temperature between 3000 and 3300 deg. F. This can be successfully accomplished if the steel is melted in conveniently sized heats of $\frac{1}{2}$ to 1 ton each, so that the pour may be completed before the necessary high temperature is lost. The

induction melting process is admirably adapted for this practice because it permits of rapid melting and production of small heats under a high degree of control, so necessary to meet steel castings requirements. A detailed discussion of induction melting, as applied to the production of pressure castings, may be found in an article "Modernized Steel Casting Foundry," by H. W. Maack, in the *Valve World*, January-February, 1940.

A second highly important advantage for the small induction steel melts for making small steel castings arises out of the control afforded in the pouring operation. A large ladle of steel, such as tapped from an electric arc furnace, must be bottom poured through a nozzle. A large head of molten steel stands above this nozzle and thus delivers the steel to the mold with such velocity and impact that it is difficult to avoid damage to the runner box of a small sized sand mold. The small sized induction heats can be conveniently taken to the molds in lip poured ladles, which deliver a well directed, slow stream, which does no injury to molds for valve bodies for as small as $\frac{1}{4}$ in. pipe sizes.

A further advantage for the small casting made from the induction melted steel lies in the possibilities opened up for the unrestricted application of grades of steel made to com-

ply with the stringent composition requirement imposed upon steel castings designed for installation by welding. The new A.S.T.M. specifications A-216-39T cover weldable cast carbon steels.

In addition to careful restrictions upon carbon content, these specifications also limit the contents of nickel, chromium, copper, molybdenum, and tungsten tolerated as incidental impurities. Since excessive amounts of these elements may contribute to either "air hardenability," or drossiness in the weld, they are held undesirable in carbon steels desired for ease of weldability. Ease of weldability in a steel casting implies freedom from the necessity of stress-relieving treatment in certain types of field installation. Thus, the ability of a melting process to consistently turn out heats complying with an exacting A.S.T.M. specification, such as A-216-39T, is of utmost importance to the economical production of a high grade line of cast steel valves or fittings, where individual items selected at random from stock can be guaranteed of weldable grade.

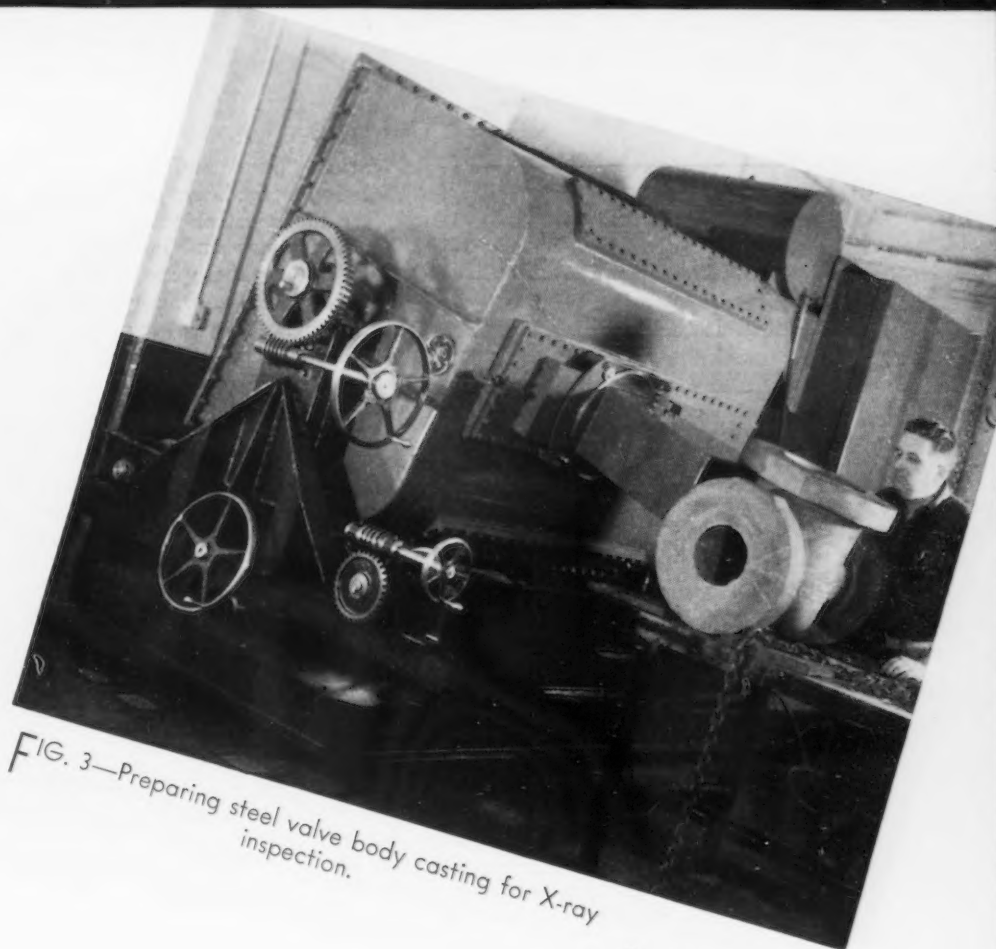
Production of A-216 steel based on large electric arc furnace heats involves a serious problem for the steel foundry not encountered when the small induction melted heats are used. The number of arc furnaces available in any steel foundry is necessarily limited. Production schedules demand that these large furnaces be used indiscriminately for alloy steel heats, as well as carbon steel. If a carbon steel heat follows an alloy steel heat containing an appreciable content of either nickel, or chromium, there inevitably results a pickup or "wash" of appreciable content of these metals in

the carbon steel heat as incidental impurity—frequently great enough to rule out the heat as complying with weldable carbon steel as defined in A.S.T.M. specifications A-216-39T. Thus, in order to guarantee that a stock line of small castings completely complies with this specification, it is necessary to schedule production so that no casting be made upon wash heats. The added flexibility of induction melting is a practical solution to this production problem.

FIG. 4—Charging valve castings into a heat treating furnace.



FIG. 3—Preparing steel valve body casting for X-ray inspection.



The various grades of cast steel, as all other ferrous material, are subject to very careful limitations of temperature and working stresses by codes established in the interest of safety by various engineering standards groups. Such limits have been based upon exhaustive studies of the physical and chemical properties of these steels at elevated temperature. The A.S.M.E. Boiler Code Committee has established a schedule of permissible work-

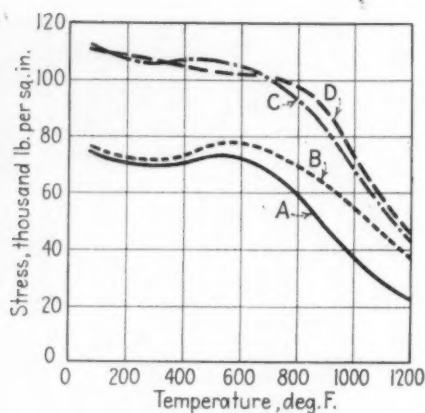


FIG. 5—Average tensile strength of cast steels. (A) carbon steel; (B) carbon-molybdenum steel; (C) nickel-chromium-molybdenum steel; and (D) 4 to 6 per cent chromium-molybdenum steel.

ing stresses for steel castings, as well as for wrought steel products, at elevated temperatures. The Boiler Code has established basic working stresses for steel casting equivalent to those adopted of rolled or forged steel of the same nominal composition. These stresses are all subject to quality factors, dependent upon the degree of inspection and integrity established for the casting. It is significant that the A.S.M.E. Boiler Code steel castings, made under A.S.T.M. specifications A-216-39T, are permitted for temperatures up to and including 1000 deg. F., whereas the ordinary pressure vessel steel castings made under A.S.T.M. specifications A-95 are limited to 950 deg. F.

Modern Quality of Castings

The importance of rigid inspection standards for developing high quality in any type of pressure vessel, be it cast or forged, large or small can not be over-emphasized. The exacting problem constantly confronting the steel founder of pressure vessels in maintaining high standards has perhaps made him more critical of his product and more inspection conscious than the corresponding fabricator of wrought metals, who may be inclined to take the quality and integrity of his material for granted. That cast steel can be, and is being, made today of such a high quality that it supplants usages for which formerly only wrought materials were considered dependable, is attested by the recent advertising of a large motor car manufacturer under the title "An Old Metal Goes Modern." To quote:

"Cast steel . . . is far different from the cast steel that engineers used to know. A high degree of specialization has been reached. Formulas differ for

various parts and improvements in casting methods are equally important. A complete steel foundry within the main foundry has just been installed for casting these steels by the continuous process. One by one, new cast steel parts have been introduced—crankshaft, pistons, centrifugally cast

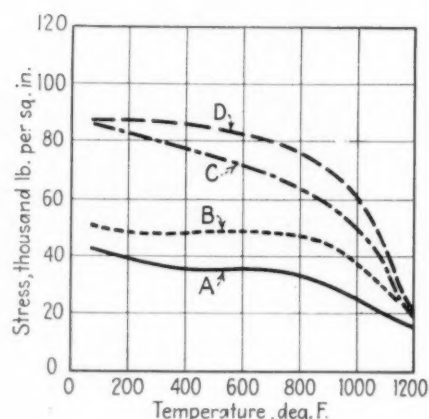


FIG. 6—Average yield strengths of cast steels. (A), (B), (C) and (D) as in Fig. 5.

ring gears, transmission cluster gears and others. These modern steels differ from ordinary cast steel in content and heat treatment. They are stronger, more uniform in quality. Where they replace forgings, they are at least as strong in every case—usually stronger. Their actual performance has proved superior. They permit simplification in design. They make better, lighter parts . . ."

Radiographic Inspection

Such unreserved acclaim and testimony for steel castings is backed up to a large extent by the assurance afforded through modern inspection methods. No longer is it necessary to destroy a casting to learn whether or not it contains injurious internal defects. Radiographic examination has made possible non-destructive verification of castings from the lightest section to the heaviest used in pressure vessels. Light section castings can be thoroughly verified for soundness by X-ray technique. Using a 400,000-volt X-ray tube, but a few minutes' exposure is required to obtain the verification on a section up to 6 in. thick. It thus becomes feasible, not only to make copious use of radiography to aid in the development of a small vessel design, but also to follow through its production by periodic inspection. Large steel castings are frequently radiographed for soundness by use of the gamma-ray and radium technique, which, although more time-consuming than X-raying, presents

certain advantages when heavy sections are dealt with.

Through the use of the radiograph, it has become possible to make small standard line castings entirely free of objectionable defects. In the case of large special castings, where repeated experiments toward the attainment of perfection is not always feasible, the use of radiography affords the steel founder the advantage of accurately locating repairable imperfections, which otherwise might only become known through expensive destruction of trial castings, or, what is worse, by failure in service. Having accurately located an objectionable imperfection in a large casting by both careful visual and radiographic examination, repairs by welding may be effectively undertaken.

Hydraulic Pressure Testing

Important and indispensable to the final verification of a pressure casting is hydraulic testing at pressures in excess of those to be encountered in service. The hydraulic pressure test is a 100 per cent "must" before any casting is passed on from the factory for use. Any porosity which might escape detection through other inspection is certain to show up through leakages in high pressure testing. Should a leak appear in the pressure test which is not considered serious enough to warrant rejection of the casting, repair by welding is generally considered acceptable. Peening of a defect to stop a leak is a practice which is thoroughly tabooed by the conscientious manufacturer of pressure castings. A peened defect, although it may effectively close off leakage in a water test at atmospheric temperature,

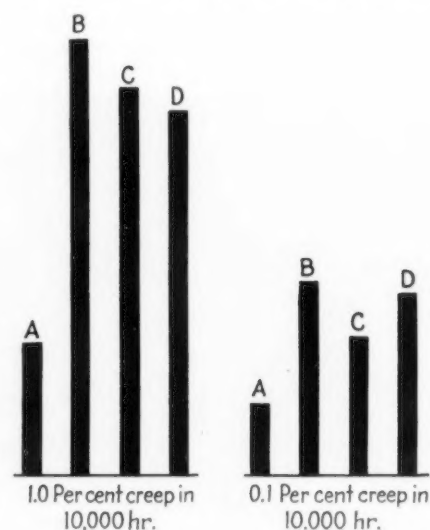


FIG. 7—Comparative creep strengths of cast steels at 950 deg. F. Steels (A), (B), (C) and (D) same as in Fig. 5.

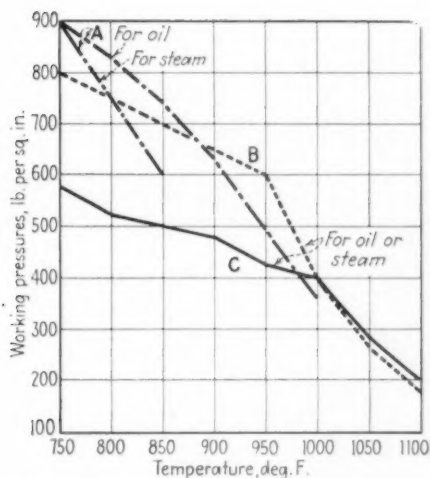


FIG. 8—Comparison of working pressures for cast steels. (A), (B) and (C) same as in Fig. 5. Working pressure for (A) is 900 lb.; for (B), 600 lb.; for (C), 400 lb.

is not a safeguard against leakage at superheated steam temperatures, and is, therefore, not generally tolerated.

Heat treatment plays a most vital role in establishing the physical and chemical properties looked for in steel castings. An un-heat-treated steel casting, as it comes from the mold, represents but a small part of the gain in toughness, ductility, and strength to be attained through good heat treatment. The tensile properties attainable in various grades of steel are depicted in Figs. 5 and 6. The comparative creep strengths at 950 deg. F. for these steels is shown in Fig. 7. These properties are reflected in the standard working pressures permissible for these steels as depicted in the chart shown in Fig. 8, where the established engineering limitations of various grades of steel may be compared.

Accurate knowledge of the thermal character of cast steels is of utmost importance, not only to insure best heat treating practice, but also to the understanding of behavior during solidification in the mold and during welding operations. The optical dilatometer proves a most valuable aid in the development of cast steels and their treatments. This instrument precisely charts the critical transformations affecting the grain refinements during the heating and cooling of the steel. Such transformations are accompanied by discontinuities in the thermal expansion or contraction accompanying the cooling or heating which may be studied to reveal pertinent facts about requisite heat treatments. In Fig. 9 are shown dilatometer curves for three grades of cast steel. These curves were obtained in a heating and cooling cycle representative of the rates encountered in the com-

mercial heat treating of steel castings. The heat of steel tested for the curve designated Grade WCB represents steel having about the maximum contents of nickel and chromium permissible under A.S.T.M. specifications A-216-39T. The critical transformation ranges are well defined and upon cooling, the transformation is complete at about 1160 deg. F. The steel designated Grade WCI, carbon-molybdenum, does not have as clear cut a cooling transformation as does WCB and, therefore, is understood to require greater precautions in heat treatment than does WCB. Steel WC4 is of a type shown to have a definitely suppressed cooling transformation, which implies that such a steel requires much greater consideration and inspection through all manufacturing operations than does either the plain carbon Grade WCB, or the carbon-molybdenum Grade WCI.

An outstanding characteristic of heat treated cast steel is its rigidity, combined with toughness and shock resistance. Much experience with pressure vessels has indicated that certain strength advantages through this "stiffness" of steel castings do exist, and are lost, to a certain extent, when the same vessel is made of wrought material. The directional properties of castings do not present the problems sometimes encountered in the "fibering" of forgings, where transverse strength and ductility is appreciably less than longitudinally. The grain refinements attained in the various steps of the heat treatments accorded steel castings lead to a uniformity of fiber, strength and ductility in all directions, which in a measure may be responsible for the rigidity and stiffness, and general toughness possessed by steel castings.

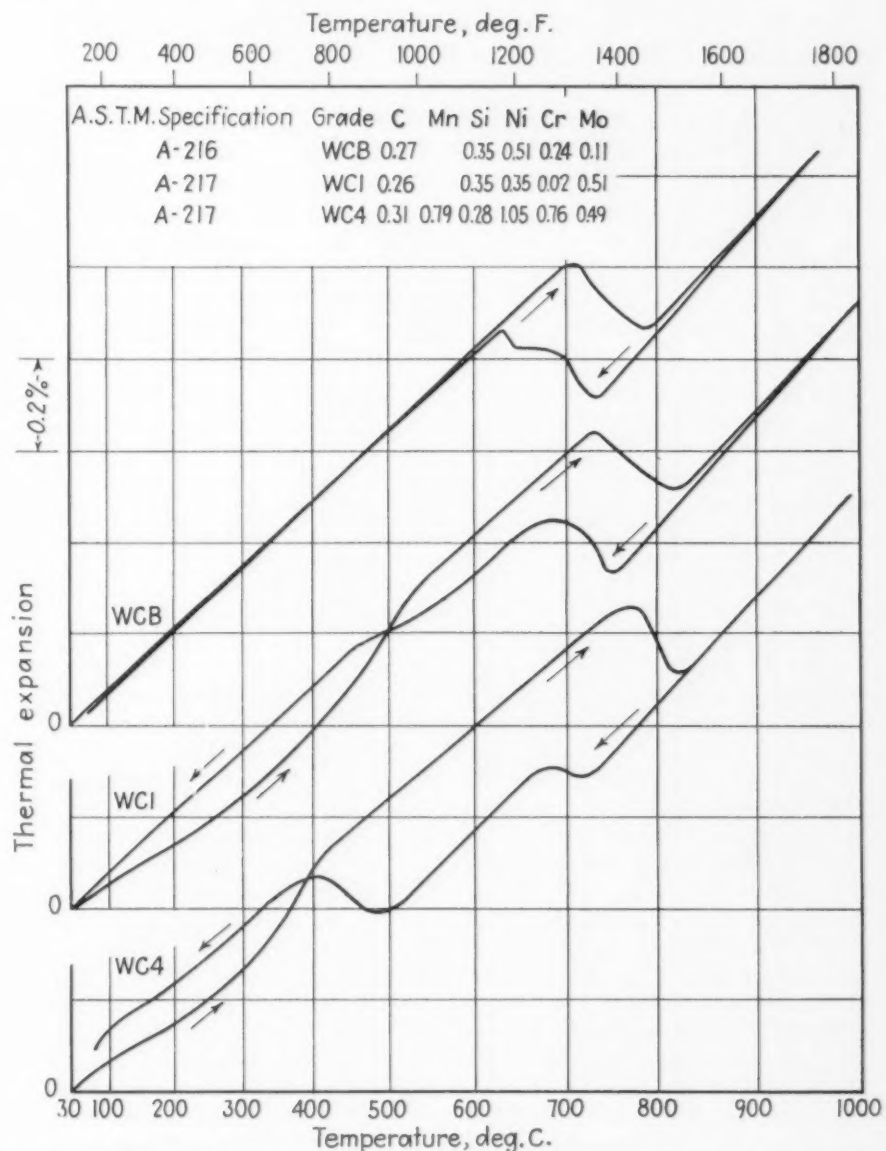
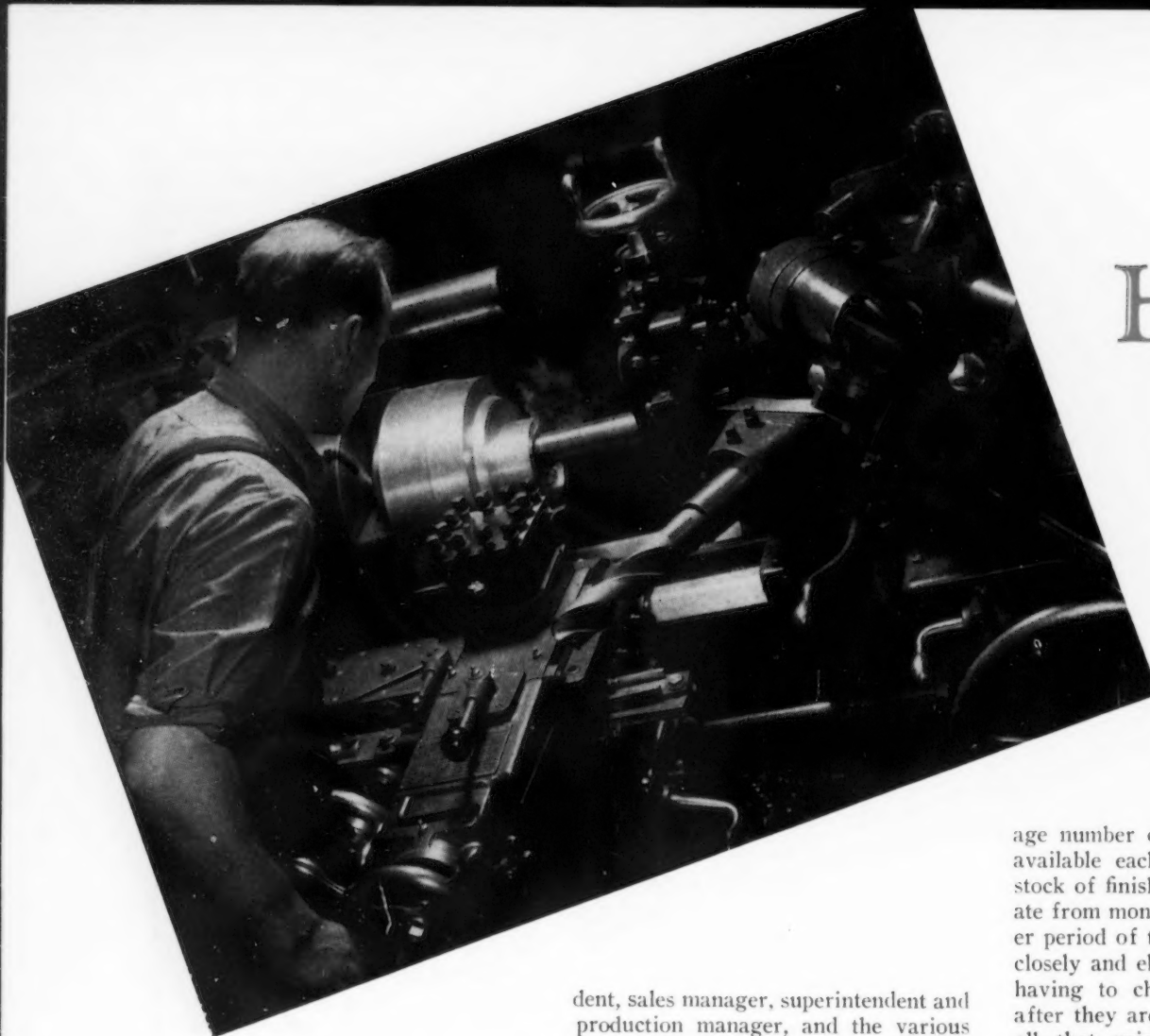


FIG. 9—Dilatometer charts for cast steels showing thermal expansion changes at the critical transformation temperatures. Cycle—heat to 1000 deg. C. in 2 hr., cool to 30 deg. C. in 5 hr.



How to

By G. V. BLACK
Production Manager,
Warner & Swasey Co.,
Cleveland

WHEN manufacturing was based on small scale production, plant superintendent and foremen usually relied on memory in following orders through the shop. As business expanded, however, and products became more varied and complex, they found it increasingly difficult to keep in mind the various oral instructions to be followed on a particular job. Production departments were then created. Today, production planning and control departments are the outgrowth of these original production departments.

There are small shops today that operate without much of a production planning system, but consider what a problem a large plant would have without one.

Warner & Swasey builds for stock 10 different size machines, approximately 600 small tools, and 200 supplementary machine units, the whole of which, including service requirements, involves approximately 15,000 different finished parts.

The plan of manufacture is based upon a definite pre-determined schedule which is worked out the first of each month by a schedule committee consisting of the executive vice-presi-

dent, sales manager, superintendent and production manager, and the various models to be built, with very few exceptions, are based on past average sales during the past year or two years. That is, if the plant is going to build 100 machines per month, and the past average sales show that 10 per cent of the shipments are No. 4 machines and 15 per cent are No. 5, then the monthly schedules will call for 10 No. 4 machines, and 15 No. 5 machines. This method insures having an aver-

STRIVING for simplicity and the elimination of unnecessary clerical work, Warner & Swasey Co. is meeting satisfactorily the supreme test of its production control and planning system under today's high pressure demand for machine tools. The system described is the result of 20 years' careful study and departs rather sharply from recommendations made in two articles on the subject in the April 18 and 25 issues of THE IRON AGE. This plan is not recommended as a cure-all but certainly should contain suggestions of value to many other plants.

age number of all types of machines available each month, and while the stock of finished machines may fluctuate from month to month, over a longer period of time it averages out very closely and eliminates the necessity of having to change monthly schedules after they are in process. This saves all that grief and extra costs that naturally accrue to changing schedules.

After the schedules have been approved, the bills of material are checked against the stock records to determine the parts to be made, and operation sheets and drawings are blue printed and inserted in a "shop traveler" together with the necessary time cards. Shop travelers were designed with the idea of eliminating all clerical work in the shop, and in the Warner & Swasey plant to combine work orders, inspection reports, move tickets, and stock room receiving reports, and finally to wind up in the cost department where they serve notice that the job is completed, and give in detail the number of pieces completed and scrapped on each operation.

This shop traveler is also the key to the entire production control system. A manufacturing order number is assigned to each, indicating the order of preference each job should have in the shop. A series of 1000 or more numbers is assigned to each week of the month, and all jobs that are scheduled to finish May 7 will bear a series of numbers, say from 15,001 to 15,999; those to be completed May 15 will carry 16,001 to 16,999, etc.

Shop travelers are filed in each department in numerical order, and

Control and Plan Production

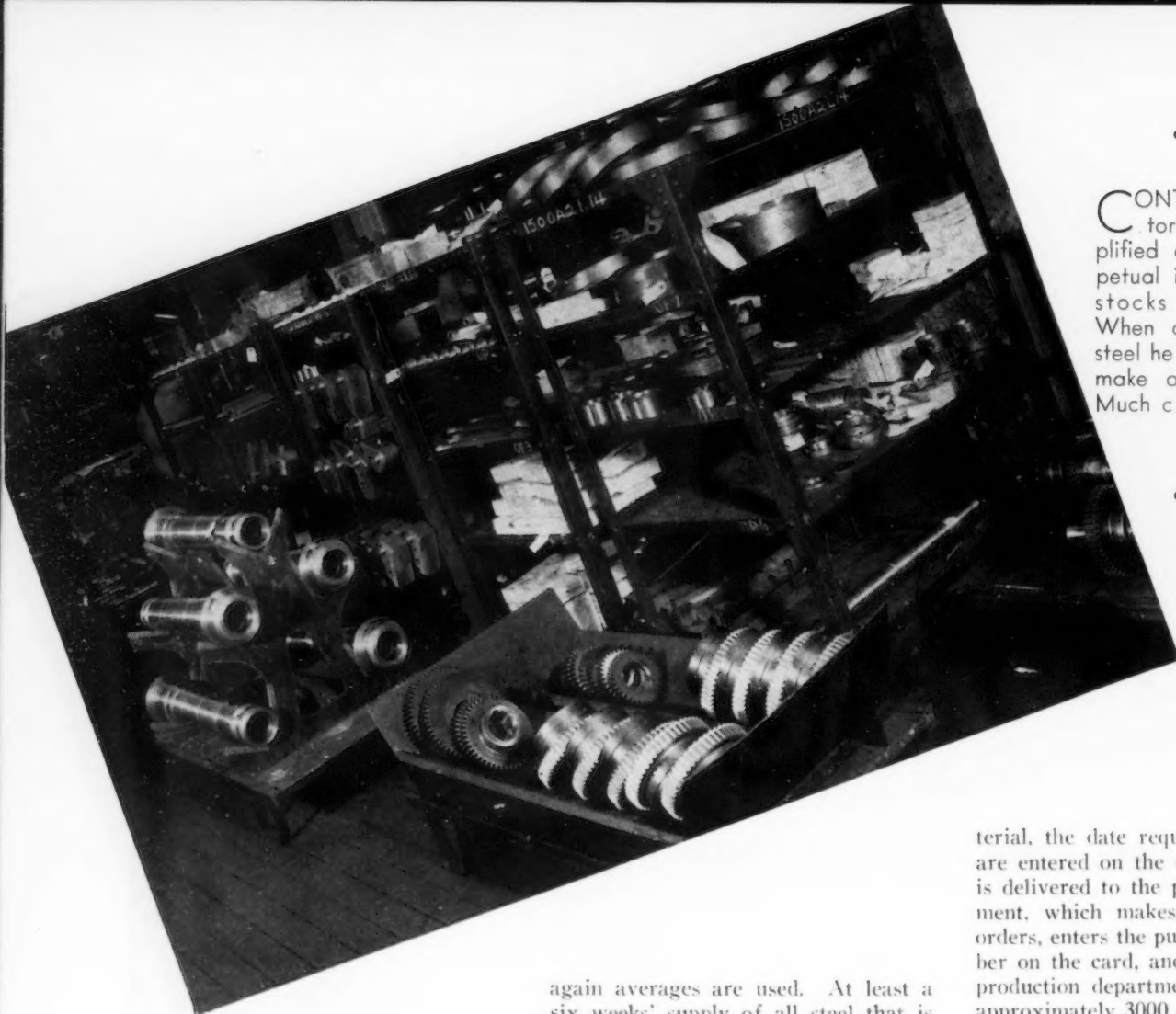
serve to remind each foreman of the oldest jobs in his department and the order of preference to be used in assigning the work. They also serve as a handy method of locating the work (progress charts are not used except on a few large parts). The shop traveler remains in the foreman's of-

vice while the operation sheet and blue print of the part stay with the job. When an operation has been completed, the floor inspector checks the work, gets the shop traveler from the foreman's office, enters the number of pieces passed, the number scrapped, signs his initials and places the opera-

tion sheet and blue print inside the traveler. It then accompanies the job to the next department, where it is again filed in the foreman's office.

All shop travelers for castings and forgings are delivered to the "casting buyer," who is a member of the production planning department. He

THE "shop traveler" developed by Warner & Swasey Co. eliminates clerical work and combines work orders, inspection reports, move tickets and stock room receiving reports. It winds up in the cost department.



CONTROLLING inventories has been simplified greatly. No perpetual inventory of steel stocks is maintained. When a foreman wants steel he does not have to make out a requisition. Much clerical work is saved.

orders all castings, follows them upon delivery, checks them in on arrival, and finally approves the invoices. This procedure is entirely independent of the regular purchasing department, and permits closer supervision of production in the foundries and forge shops, and ties up deliveries with schedules with a minimum of effort. In addition there is a saving in clerical work. It is not necessary to make out any purchase requisitions as the orders to the foundries are typed from the bills of material after the quantity to manufacture has been determined.

The shop travelers for parts to be made of steel and other bar stock are kept in the production planning department, and released to the shop in accordance with the manufacturing order number, taking into consideration the type of job and the ordinary length of time it should take to process it in the shop.

In connection with the steel storage department, the company does *not* keep a perpetual stock inventory. There is a stock card for each size and kind carried. Postings are made on this card to show all purchases and deliveries. The card also has a section for posting periodic inventories. Here

again averages are used. At least a six weeks' supply of all steel that is used at all regularly is maintained. A monthly inventory of these items serves to eliminate shortages and, at the same time, to keep the steel stock at a minimum consistent with the production schedule. Naturally, there is maintained a larger stock of all special items on which the mills require more than 30 days for delivery. The author's company is probably fortunate in having sources of supply that can make delivery the same day, if necessary, on sizes which are used in small quantities. These sizes are not included in the monthly check-up.

When a foreman needs steel he merely 'phones his order to the bar stock department and does *not* have to make out a requisition. The cost department uses standard material costs in figuring costs, so no requisitions are needed except on special jobs made in the tool room.

Also eliminated has been the necessity of making out any requisitions for the purchase of finished stock material and supplies, such as bearings, bolts, screws, pins, keys, nuts, grinding wheels, etc. A double stock card is used, the upper half serving as a requisition and permanent record of the date, quantity purchased, and purchase order numbers. When it is necessary to purchase any of this ma-

terial, the date required and quantity are entered on the card and the card is delivered to the purchasing department, which makes out its purchase orders, enters the purchase order number on the card, and returns it to the production department. As there are approximately 3000 of these items, the saving in clerical work can be appreciated.

The only progress chart used deals with the 10 large parts on each machine, namely beds, saddles, carriages, spindles, etc. Twice a week one of the stock chasers takes this record into the shop and posts the progress of each item up-to-date. A list of all of the items that are behind schedule is then made up for the superintendent who contacts the foremen regarding bringing these parts up to schedule.

There is no load record kept, as experience with it was not very satisfactory. Because of changes in schedules for small tools and service parts, it became quite a clerical problem to keep it up-to-date, and the accumulated errors, due to clerical mistakes, at the end of a six months' period were more than enough to nullify the value of it. Maybe the author's company was not smart enough to work it out properly, but as the desired results are secured now in another way without all this clerical work, the company is content to forget about it.

Experience shows that if there is a definite pre-determined schedule that is set up reasonably far in advance to allow time to get the necessary raw material (assuming there are adequate and reliable sources of supply) and if

there are proper plant capacity and personnel, fully 80 to 90 per cent of the parts will go to stock automatically on time, and the remainder will be so near completion that the two-week period allowed for chasing is ample time to clean up all shortages.

In order to determine the number of producers required to make a definite schedule, the planning is done entirely on past averages. Once a week the time clerks in each department make a résumé of the producers in their department and the jobs they are working on. These reports are then summarized for the entire shop, and over a period of a year they give a definite basis to work on.

It will show, for example, that on a basis of 100 machines per month:

400 producers are working on standard machines,

75 producers are working on service orders,

100 producers are working on small tools,

25 producers are working on special orders,

20 producers are working on expense items, and

15 producers are absent.

This analysis also shows the percentage of each of these groups required in each department. Therefore, if it is desired to build 150 machines per month, the personnel is merely stepped up 50 per cent over the above figures. If there should be an attempt to build up the force above the machine capacity in any department, it is automatically shown up by these figures. This method has been checked and double checked a good many times during the past two years, and it is interesting to see how accurately requirements can be measured.

In regard to assembly, all of the parts are scheduled in the machine shop so that they are completed two weeks prior to the date actually required on the assembly floor. This permits these units to be issued for assembly and withdrawn from the stock room two weeks prior to the date needed. Any shortages are then turned over to the stock chasers and this two-week period enables them to clean them up without holding up the assembly schedule.

Special assembly trucks of Warner & Swasey design are used for storing the parts when they are withdrawn from the stock room, and the parts are

arranged on these trucks in accordance with the assembly operations. That is, if the first operation is keying a gear to a shaft, then the three parts composing the sub-assembly are placed together on the assembly trucks. These trucks remain on the assembly floor until the lot is completed, and then returned to the store room.

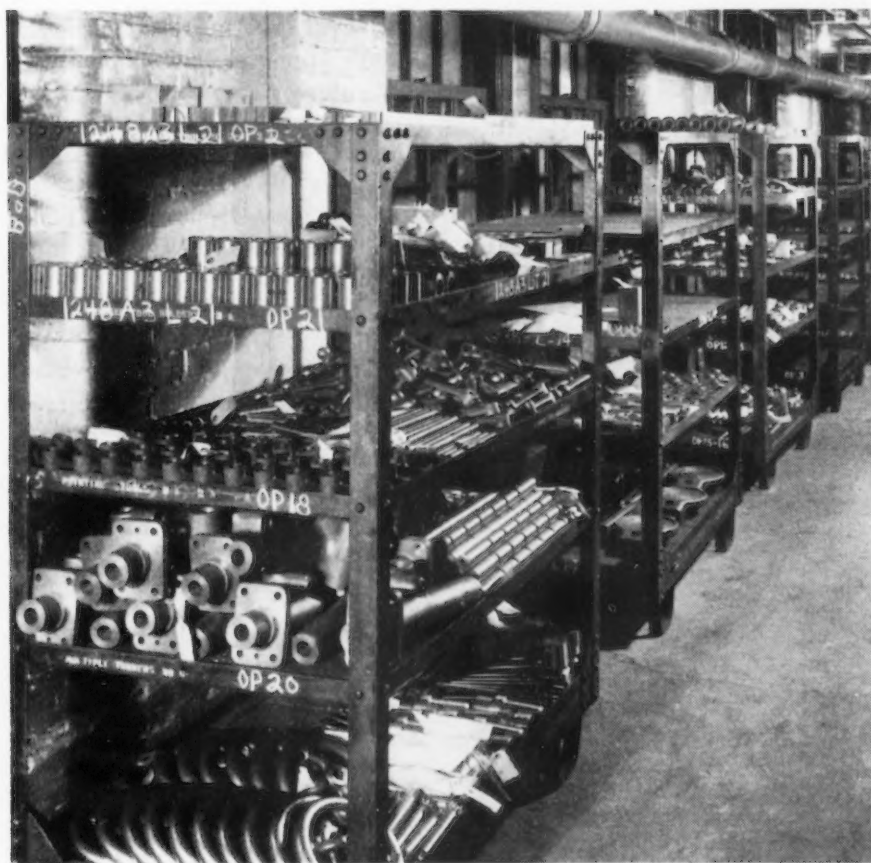
In order to eliminate the necessity of posting disbursements on stock records for all small purchased parts, such as cotter pins, bolts, nuts, oilers, washers, woodruff keys, etc., a reserve storage equal to one month's requirements has been set up, and when the stock in the regular bin is used up, the stock room clerk merely transfers the reserve stock to the regular bin and sends to the purchasing department a special form calling attention to the fact that he has made the transfer. This permits an order to be placed for a new supply without running into shortages and having to rush the purchasing department to get them in promptly. In ordering these parts, if the monthly consumption is 1000 pieces, 2000 pieces are ordered, specifying half for reserve storage and half for regular stock. This method saves clerical work in the stock room, eliminating shortages on all purchased parts, and saves time in the purchasing department and the production department. Approximately 500 items are handled in this way.

Superintendents and foremen have been carefully educated regarding this simplified system. Their full cooperation is at all times necessary to insure the production flowing smoothly and according to schedule.

The executive officers realize the benefits of a definite pre-determined schedule based on past averages, and consequently the production schedules are not being continually disrupted, due to frequent changes, except for changes in design.

As deliveries are the test of any production control system, Warner & Swasey is willing to let its customers speak for themselves about the record in meeting promises.

The present set-up is not the result of copying a nationally known system, nor the product of any group of engineers, but is the result of 20 years of trying almost every conceivable idea that could be picked up from plant visitations, magazine articles, and suggestions from within the plant organization. It is not advocated as a "cure-all" for any other shop, but it is hoped that there may be some suggestions here that may help eliminate some of the headaches in industry today.



PROPERLY storing parts on trucks greatly facilitates matters. Parts are arranged on Warner & Swasey's special assembly trucks in accordance with assembly operations.

Hammers, Hatchets,



FIG. 1—Hatchet heads are drop forged of highest quality tool steel.

• • •

FIG. 2—The forged tools are cleaned of all fire scale on this Pangborn blast table using steel grit as the cleaning medium.



*Quality products
shaped, treated and
finished with simple—
but adequate—equip-*

By C. C. HERMANN
Mechanical Engineer, Philadelphia

• • •

THREE important factors in the marketing of hammers, hatchets, axes, sledges and tools of like nature are utility, finish of product and quality of materials used. Quality of product is the result of careful selection and accurate control of the raw materials coupled with the skillful performance of the various production operations which serve to change these raw materials into finished product. Given sufficient experience in manufacturing supported by sufficiently extensive investigations and experimental work the product should possess a high utility value.

With finish it is different. This is where the artist complex of the manufacturer comes to the surface. Unless the article produced has "eye appeal," if it does not attract and hold the attention of the buying public, its success may be greatly hampered. Even a hammer, an axe or sledge may be so proportioned, balanced and finished as to make it an object of beauty.

Fayette R. Plumb, Inc., Philadelphia, has been making quality tools since 1856. Here, and in the subsidiary plant at St. Louis, are produced 28 different kinds of hammers, 34 different kinds of hatchets, 7 different kinds of edge tools, 24 different kinds of sledges and other heavy tools, and 31 different kinds of axes. In the sub-

Sledges, Et Cetera . . .

ment. Handling facilities, particularly, are unpretentious but still completely functional.

sidiary plant, known as the Delta File Works of the Carver File Co., located adjacent to the parent plant, is produced a full line of files for every purpose.

The quality and finish of the product starts even before the first operation. Every bar of steel going into Plumb tools is produced by leading steel mills to meet the exacting Plumb specifications and purchased in quantities sufficient to insure uniform results. Only high grade tool steel is used and only the best of second growth hickory goes into the handles of the product.

In Fig. 1, is shown a forge shop unit consisting of three forging presses with their complement of heating furnaces. The work is produced from bar steel, heated in oil fired furnaces. The first heat serves for the initial forging operation consisting of breakdown and rough impressions with the final cutting off of the bar in a total of six passes. The second heat serves for the final impression and forming the handle eye under a 1000-lb. Massillon air hammer. The final operation consists of opening the eye to one side, in the case of the hatchet, and trimming the flash. Hatchet heads are thus produced at the rate of 200 per hr. by this unit.

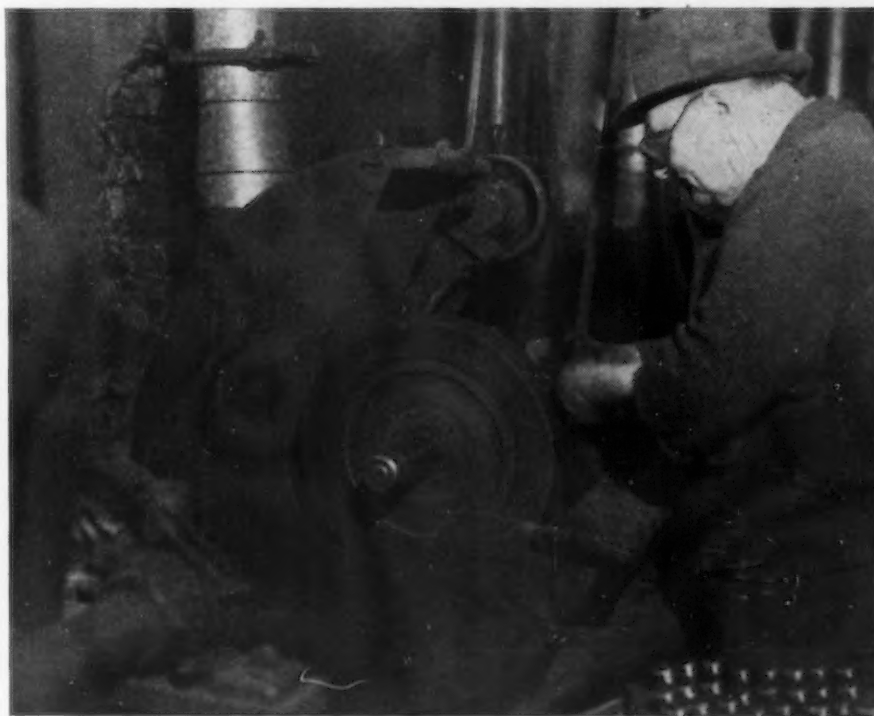
Leaving the forge shop, the work is placed on the revolving table of a Pangborn blasting machine, shown in Fig. 2, where the fire scale is removed. The workmen lay the work on the table, turn it, as it completes the first circuit under the blast, and remove it to the truck at the end of the second



FIG. 3—Grinding hammer heads on a single end grinder by hand seems antiquated, but is fully satisfactory.

• • •

FIG. 4—The hammer face is polished on leather and rag wheels faced with abrasive grains.



round. The work then goes to the grinding and polishing stations. In Fig. 3 is shown the grinding operation on the side of the hammer head, and in Fig. 4 is shown the polishing operation on this same tool. The grinding wheels used are 24 in. in diameter by 4 in. face on single-end grinders which, at first glance, appear to be rather old and antiquated but which are in reality one of the important phases involved in maintaining quality of product. Twenty-five of these machines are in use in this department alone.

The polishing operation is performed on 18 in. diameter cloth and leather wheels faced with different sized abrasive. For polishing the face of hammers four grain sizes are used, namely, 60, 90, 120, and 150 grain. The wheels are dressed with abrasive in a room set aside for this operation. The dressing of a wheel consists of coating the surface with a glue after which the wheel is rolled in a trough containing the abrasive and then placed in a drying oven for from six to eight hours. The wheels are thus used over and over. The abrasive is also reclaimed, cleaned and re-used.

The product then goes to the heat treating section where the hammer face and the cutting edge of hatchets

and other edge tools are hardened. Propane fired furnaces, shown in Fig. 5, are used. This heating operation is fully controlled so that the variation in temperature is not more than 5 deg. F. plus or minus. The tools are strung on notched bars to space them properly

and insure uniform heating. The bars are then laid across the top frame of the furnace with the portion of the tool to be treated projecting into the heat. After sufficient time for heating has been allowed and the work is thoroughly heated to the desired tempera-

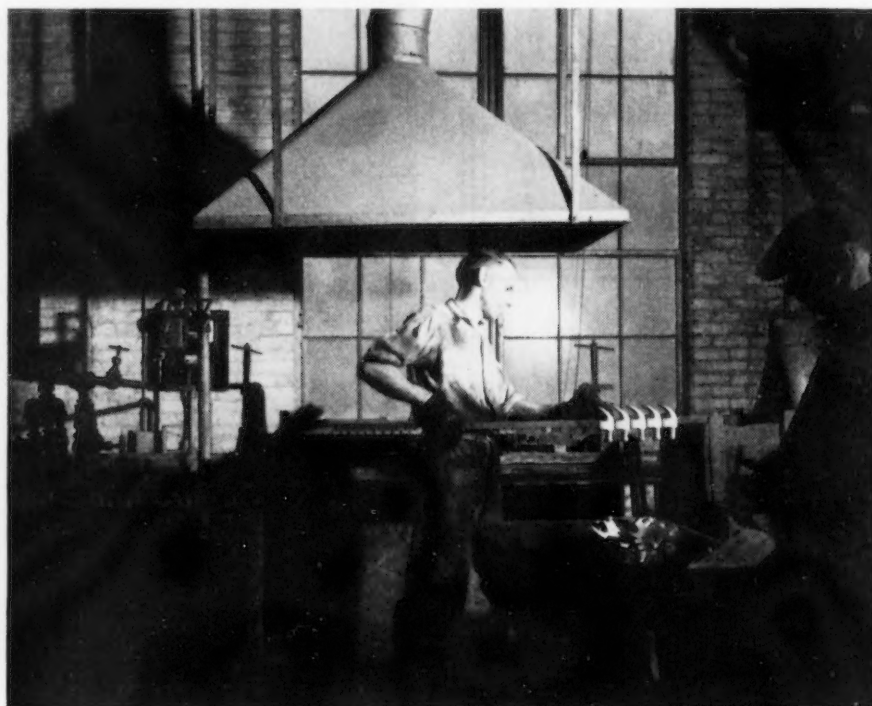


FIG. 5—Hammer faces are heat treated in special furnaces fired with propane gas and provided with automatic control.



FIG. 6—Spray painting hammer heads as they hang on conveyor hooks, two to the hook, which is turned by the crank extension at top of conveyor.

ture, which varies from 1450 to 1475 deg. F., the bar with the tools attached is lifted to the quench tank. The quenching medium is circulated brine.

Following the quench, the tools are individually inspected by two processes. The first is an observational inspection made by the inspector striking the treated portion of the tool with a pointed steel hammer of the same hardness. The rebound of the striking hammer is observed and the ring of the blow noted. In the second inspection for hardness the tool is placed on a Rockwell testing machine where it has to pass a test of 56 to 58 Rockwell.

In the painting operation shown in Fig. 6, the tools are painted with a baking enamel prior to receiving the handles. A rather ingenious conveyor system has been devised for this operation consisting of hooks secured loosely to the conveyor chain of conventional design. The hook is provided with an extension in the form of a crank. The tools are hung on the "T" hooks, one

piece on each prong, and as work passes the spray position it is turned by the spray operator so that all surfaces of both pieces are thoroughly covered.

The work is then transferred to the hooks provided on a large rack oper-

The last machining operation on the tools is performed following the painting. This is a very fine mirrored polishing operation performed with leather wheels coated with 200 fine abrasive. The resulting surface is free of all previous tool marks, presenting

in the finished surface the clear blue "steel" color. The work is hung directly on the overhead conveyor, which is power driven, and from which it is removed by the inspectors. Work passed by the inspectors is placed on a belt conveyor by which it is carried to the handling and subsequent operations.

The heads go to the handling operation on the belt conveyor. The handles are pressed into the eye of the head in a vertical press provided with a gage to make the over-all dimension of like tools the same. The tool then travels to the wedge position where the wood wedge is inserted. It then goes to the saw where the protruding end of the handle is removed and then the screw wedge is inserted. The screw wedge is used in preference to all other methods due to the ease with which a loose handle may be tightened in the head by merely turning the screw deeper with a screw driver.

Near the end of the assembly line, as shown in Fig. 8, is located a spray boot in which a lacquer is sprayed on the polished surface of the tool before it is finally wrapped and packed for shipment, thus insuring that the finish will be preserved even though the tool is subject to dampness in shipment, in stock or in stores.

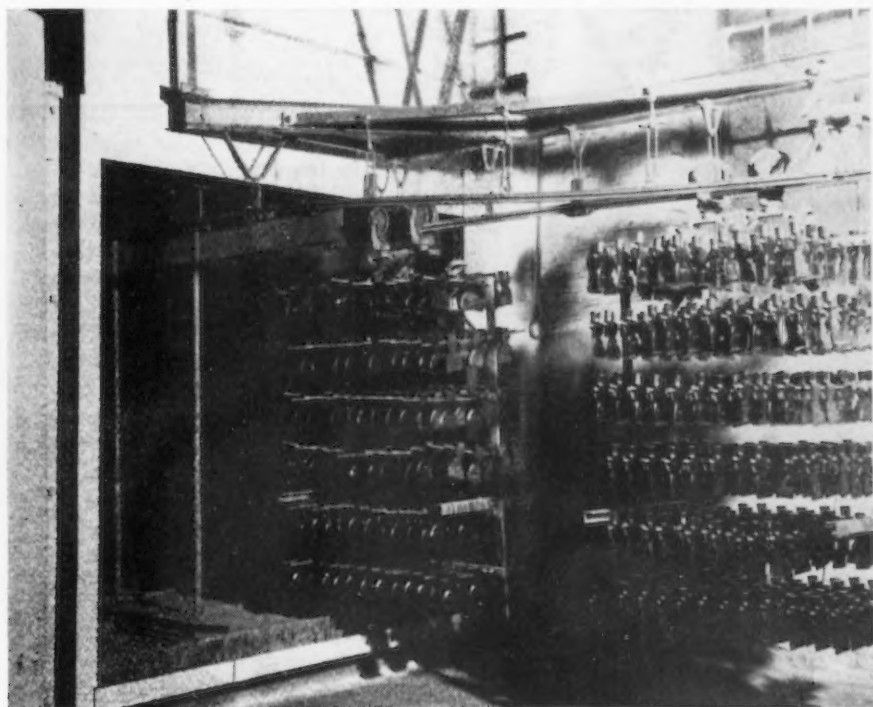


FIG. 7—The tool heads are hung on specially designed racks supported on overhead trolley track and pushed into the electric baking oven.

ating on an overhead conveyor. Each rack is capable of holding 500 lb. of product and 12 of these racks comprise a load for the electric furnace shown in Fig. 7. This is a batch type, General Electric baking oven, thoroughly insulated and provided with forced ventilation. The heating elements are of the ribbon type placed along the inside walls near the bottom. The capacity of the oven is 12 racks or 6000 lb. per batch.

The oven is operated ventilating about 30 per cent and recirculating 70 per cent for the first 3 hr. and thereafter 100 per cent recirculating. The volatile gases are driven off during the early part of the baking period. During this time the energy drawn by the oven is 60 kw. per hr. and for the balance of the baking period, which is approximately 5 hr., the kilowatt consumption is reduced to 15 kw. per hr. The total energy charge is therefore 255 kw. or 42.5 kw. per 1000 lb. of product.



FIG. 8—The polished face of the tools would rust were it not for the lacquer coat sprayed on prior to wrapping and boxing for shipment.



Fundamentals of

IN the first part of the article, which appeared in the July 4 issue, the author analyzed the cutting action of grinding wheels and indicated how the same wheel may be made to act either hard or soft. Herein, in the second and concluding part, Mr. Work discusses the general principles governing the choice of abrasive, grain size, structure, bond and grade as related to the material being ground and the quality of finish desired.

CLOSER grain spacings are usually used where it is necessary for the wheel to hold its form. In extreme cases, such as the thread grinding operation shown, form is maintained further by reducing the stresses on the wheel face. This is done by using higher wheel speeds and lower work speeds.

A SKILLFUL operator can often manipulate a wheel that is poorly suited to the work at hand so as to produce a fairly satisfactory job of grinding. This is particularly true of a hand operated machine as there is less opportunity for manipulation with an automatic or semi-automatic machine.

Thus, as was explained last week, if the wheel is too hard in grade, it can be made to act softer by increasing the ratio of work speed to wheel speed—and vice versa. Similarly, the action of the wheel can be changed by manipulating the traverse speed and the in-feed. One thing is certain however. When a poorly suited wheel is ma-

nipulated, the finish of the work, the efficiency of the operation or both will suffer. It is best to select exactly the correct wheel.

Selection of a wheel involves selection of the type of abrasive, size of grain, structure, type of bond and grade, that is to say, the hardness of the bond.

The type of material being ground determines which abrasive to use. "Regular" aluminum oxide is composed of tough crystals which are not easily broken. It is therefore best suited to materials of high tensile strength which are able to break the aluminum oxide crystals before they become too dull, and thus enable them to present fresh, sharp cutting edges to the work. Typical of the materials for which regular aluminum oxide is indicated are carbon, alloy and high

speed steels, annealed malleable iron and tough bronze.

At the other extreme is silicon carbide, harder than aluminum oxide, but not so tough and therefore more easily broken. The comparatively weak silicon carbide grains are quickly broken by tough materials—usually long before they have dulled. That makes for too rapid wheel wear. Silicon carbide is, however, well suited to materials of low tensile strength, for the crystals are not broken until they begin to dull, and their hard, sharp edges remove stock rapidly. But because silicon carbide is harder than aluminum oxide it is also suited for grinding hard-to-penetrate materials.

Silicon carbide is thus indicated for very soft and very hard materials. Among the former are aluminum, copper, brass and soft bronze. Among the latter are gray and chilled iron, very hard alloys and cemented carbides.

Special Aluminum Oxide

To meet some of the highly specialized conditions of modern shops it became desirable to have an abrasive whose crystals would be tougher than silicon carbide but more easily shat-

Grinding Wheel Selection ♦ ♦ ♦

tered than aluminum oxide. These qualities have been achieved by modifying the process of manufacturing aluminum oxide in such a way as to make its crystals weaker, thus easier to break. These "special" aluminum oxide abrasives combine in various degrees the qualities of regular aluminum oxide and silicon carbide. They are useful for borderline materials to which neither of the regular abrasives are ideally suited, and for fine finishing operations. Thus, one of the special aluminum oxide abrasives is usually best for finish cuts of slight depth on high tensile strength materials. The slight stresses set up would not be sufficient to break down the regular aluminum oxide crystals, but will break the special ones, giving the free-cutting qualities needed.

The use of a special aluminum oxide abrasive may be desirable due to the large area of contact necessary between a given piece of work and the wheel. A large area of contact makes for smaller stresses, which might be insufficient to break down the regular aluminum oxide crystals. Take, for example, the internal grinding of a tough material of high tensile strength. With a small diameter wheel, the area of contact would be small, the stresses great, and regular aluminum oxide would perform well. But if it is possible to use a comparatively large wheel, which usually makes for greatest economy, the area of contact would be increased to the point where the stresses would be insufficient to make the wheel self-sharpening. Here a special aluminum oxide abrasive would be indicated.

Size of Grain

The best size of abrasive grain is dictated by the material to be ground, the amount of material to be removed and the quality of finish desired. When a large amount of stock is to be removed, large grains are most effective with comparatively soft materials due to the fact that large grains take large chips. However, if the material is hard, like cast white iron, the larger grains will not penetrate as readily as

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smaller ones. While the chip removed by each grain is smaller, there are so many more grains at work that the advantage is with the wheel of small grain.

In general, when fine finish or great accuracy is desired, the finer grains are used. True, a skillful operator can by careful dressing secure fairly good finishes with a coarse grain wheel, but the best results come from fine grains. In cylindrical grinding, coarse grains tend to spring the work.

It is possible to modify the action of a wheel of given abrasive, grain size

and bond attributes by varying the spaces between grains. A so-called open structure wheel is one whose grains are spaced comparatively far apart.

The properties of the material being ground, the finish required and the type of operation dictate what structure to use. Wide grain spacing is usually called for when grinding soft, ductile materials. It is obvious that larger chips are produced in grinding materials of this class. The wide spacing provides the more adequate clearance required by the larger chips, and so decreases the likelihood of the metal loading the wheel face.

However, when grinding hard materials because of the lesser penetration by the grains, it is desirable to present as many grains to the work as pos-



IN weld grinding, the wheel must cut fast and clean and give a good finish.

sible, calling for closer spacing. But exceedingly hard materials such as the cemented carbides dull the grains so quickly that it is desirable to have the grains released or resharpened more quickly. This can be accomplished by introducing more friable or brittle abrasive, or by changing the structural (bond — grain) relationship so that grains are torn out more easily.

To a considerable extent the finish secured by grinding depends upon the distance between the hills and valleys left by the grains. The closer together, the better the finish. Therefore, generally speaking, closely spaced grains should be used for fine finish.

In grinding operations where it is necessary for the wheel to hold the form, closer grain spacings are usually used. In extreme cases, such as thread grinding, stresses on the wheel face are reduced by using lower work speeds and higher wheel speeds. Thus the desired form is maintained longer.

When the pressure between wheel and work fluctuates as in surface grinding with cup and cylinder wheels and in snagging operations, it is desirable to make each grain carry its full quota of pressure. Wide spacing will ensure this.

Bond Considerations

The bond of a wheel is the medium which holds the grains of abrasive together. There are five types of bond—vitrified, resinoid, shellac, rubber and silicate. Vitrified wheels, which are made of ceramic clay burned at high temperatures, are used for more purposes and in greater total number than those of any other bond. They are strong enough for heavy work, and are adapted either to rapid removal of a large amount of material or for the production of fine finish and close accuracy. They are, however, limited in surface speed to about 6500 ft. per min. Vitrified bond is not suitable for very thin wheels, such as those used for cutting-off.

Resinoid bonded wheels are tougher and more resilient than vitrified wheels.

They can therefore be safely operated at speeds up to 9500 ft. per min. and are indicated for very thin wheels or for operations where the wheel is likely to be subjected to severe lateral pressure. Very thin resinoid wheels can be operated up to 16,000 ft. per min.

Wide-faced resinoid wheels are used for snagging steel castings, malleable castings and other operations which subject the wheel to severe shocks. On the other hand, they are also excellent for finishing cams and rolls which must have a fine finish.

Rubber bonded wheels are adapted to much the same uses as resinoid wheels—that is for thin cut-off wheels and for snagging castings. They are also used where exceptionally fine finishes are required. The regulating wheels on centerless grinders are practically always rubber bonded.

Shellac bonded wheels are known as elastic. In metal working industries they are chiefly used for finishing cast iron rolls, chilled iron rolls, and in the final finishing of hardened steel parts such as cams.

Silicate bonded wheels should not be confused with wheels made of silicon carbide abrasive. The bond is silicate of soda. Silicate bond wheels can be much larger in diameter than those of any other bonding material. They cut more coolly than vitrified wheels and so are particularly suited to grinding fine edged tools and knives.

Grade Selection

It is important to select wheels of the correct grade or hardness. This term should not be confused with the hardness of the abrasive. Grade indicates the degree of resistance which the bond puts up to prevent the grains of abrasive from being torn from the bond. As has been seen, the ideal grade is that which will hold the grains until they have dulled, and then release them. A hard grade holds the grains strongly, a soft grade permits them to be torn from the bond easily. While no precise rules can be laid down for

selecting a wheel of the correct grade, the general considerations are these:

Use a hard grade for a soft material, and vice versa. The reason is that a soft material will not dull the grains quickly, so it is desirable to retain them in the wheel as long as possible. A hard material dulls the grain quickly, so the bond should be soft enough to permit the grain to be torn out as soon as it is dull.

The stresses set up by the grinding also affect the selection of the grade. The greater the stresses, the harder should be the grade. Thus, in general, use harder grades for small areas of contact, high ratios of work speed to wheel speed, rapid traverse and large in-feeds.

A heavy, rigid machine will in general take a softer wheel than a light one. In the same way loose spindles or machine vibration require the use of harder grades than does a vibrationless machine.

Following are suggestions as to bond type and grade for the usual run of machine shop and steel mill grinding operations. They are closely approximate. However, only actual tests under operating conditions can be relied upon for choosing exactly the correct wheel. In general:

(1) For either center or centerless cylindrical grinding, use vitrified grade I to P.

(2) For surface grinding with cup or cylinder wheels on a vertical spindle machine, use silicate bond with aluminum oxide abrasive, or vitrified bond with silicon carbide—grade range N to V in either case.

(3) For surface grinding with horizontal spindle machine, using the periphery of a straight wheel, use a vitrified wheel of M to U grade.

(4) For snagging on floor stand or swing frame grinders or with air or electric portable grinders, use F to I grade in vitrified wheels, or 8 to 12 grade in resinoid wheels.

(5) For internal grinding, use a vitrified wheel of J to S grade.

Low Temperature Brazing With Silver Alloys

By ROBERT H. LEACH

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SILVER brazing of both ferrous and non-ferrous metals and alloys has increased notably in the past few years. Joint strength is high, low temperatures suffice, and costs are low. In this first section of a two-part article—from a paper presented at the recent 40th annual convention of the International Acetylene Association—the author describes various alloys now available and gives useful data on the selection of grade and form of alloy to meet different conditions.

IT is doubtful whether many persons realize the extent to which silver alloys are used today in brazing both ferrous and non-ferrous metals and alloys. The quantities used are small in comparison with base metal brazing alloys, but the amount of joining being done with silver brazing alloys is impressive, because the best results are obtained when the joints are closely fitted and a much smaller quantity of the alloy is used than is the case with the V-joints or heavy filleted joints common to base metal brazing or soldering.

Silver brazing alloys have been used for centuries by metal workers—particularly in the silverware industry—and for making joints in those instances where strength and resistance to shock were required, such as joining band saws, shrouds and lacing wire for turbine blades, and in the fabrication of equipment where appearance as well as strength was im-

portant. The brazing alloys usually contained varying percentages of silver, copper and zinc and were called silver solders. These compositions had melting points from 1300 to 1600 deg. F., depending upon the proportions of the different metals or a range below that of base metal brazing alloys or copper welding rods which required from 1600 to 2000 deg. F.

About 15 years ago the industrial use began to show considerable increase and the interest was sufficient to cause the American Society for Testing Materials to draw up specifications for a group of standard alloys. These standard specifications, accepted and published in 1929, are given in Table I.

The alloys are called silver solders in these specifications, and although this name is widely used, it is believed by many that the name, silver brazing alloy, is preferable because the term solder is likely to be taken as refer-

ring to soft solders, which are used in large quantities in industry and melt at approximately 400 deg. F. Brazing, on the other hand, suggests higher melting temperatures than soft solders and greater strength of joints which are characteristics of these silver brazing alloys.

The eight grades given in Table I were selected after a large amount of testing had been done to determine the range of compositions required to meet the different industrial requirements. The ternary diagram of the flow points of silver, copper and zinc alloys is shown in Fig 1, and it is evident from a study of the diagram that without some attempt at standardization, there would be a tendency for the production of a large number of different compositions with no material benefit to the consumer. In fact, one of the principal reasons for setting up these standards was to eliminate many compositions which had accumulated over a long period of time, and varied so slightly from each other that there was no justification in making all of them.

The question that immediately arises is why the use of these more expensive alloys should show such a large increase. The answer is twofold: First, the demand on the part of those industries engaged in fabricating articles and equipment from sheet

metal and tubing, for better and quicker methods of joining; and second, the comparatively low melting points of these alloys, their free flowing properties and the strength of joint made with them.

Special Alloys Developed

As might be expected, the increase in the use of the standard alloys encouraged extensive research and the development of other silver alloys for brazing. There was a demand for alloys with even lower melting points without sacrificing the strength or the free flowing properties of the standard alloys. Moreover, there are certain corrosive conditions where the presence of zinc might be harmful, and in other cases copper might be undesirable. The result has been that there are available today silver brazing alloys in which other metals—such as cadmium, manganese, tin, nickel and phosphorus—are used to give special properties.

Some of these alloys have been patented but they are used to such an extent both in this country and foreign countries that any article dealing with the development of silver alloy brazing would not be complete without mention of the characteristics of some of them. The silver copper eutectic which contains 72 per cent of silver and 28 per cent of copper melts at 1435 deg. F. and is used when zinc in the alloy would give trouble. Alloys containing silver, copper, manganese, and those with a further addition of nickel and silicon, are used for similar purposes. Zinc or zinc and cadmium combined with relatively high percentages of silver provide a series of alloys that melt at temperatures between 1300 deg. and 1400 deg. F., have a white color and are used for those conditions where copper would be objectionable. A patented alloy containing silver, copper, zinc and cadmium which flows freely at 1175 deg. F. is used extensively for joining both ferrous and

non-ferrous metals and alloys, because it flows very freely at this temperature, and makes strong joints. Another patented alloy contains silver, copper and phosphorus and flows freely at 1300 deg. F. The phosphorus makes the alloy self fluxing to a considerable degree and it is used with copper and copper-base alloys, but it is not recommended for steel or iron because of the brittle phosphide of iron that is produced in the joint.

Selecting Grade and Form

There is no definite rule to follow in selecting the grade of silver brazing alloy as several different factors have to be considered, among which are: Metals to be joined, corrosion conditions, type of joint, and stresses that may be applied.

In the standard silver-copper-zinc series given in Table I, the silver content will run from 10 to 80 per cent, and those with the lower percentages of silver have the highest melting points and contain relatively high percentages of zinc. These low-grade alloys cost less per unit, but it must be remembered that much of the advantage from the use of a silver brazing alloy is lost because of the high temperatures required to melt them. It should also be emphasized that the lower first cost of the alloy does not mean that the total cost of making the joint will be less. By taking proper care in the design and fitting of the joint, such a small amount of alloy is used that the saving in time and fuel will more than offset the higher cost of a more expensive alloy with lower melting point. There is also a much greater margin of safety from damage to the metals when the alloys with lower melting points are used.

Fields of the Various Grades

As far as melting point is concerned a silver-copper-zinc alloy containing 10 per cent silver does not have any

material advantage over the common brazing or spelter alloys, but it contains about 12 per cent less zinc and as it is malleable and ductile, it can be rolled into thin strips and drawn into fine wire. It is sometimes used when quenching at temperatures about 1300 deg. is done after joining, and with copper and copper-base alloys when first cost seems to be the controlling factor, and it is felt that the heating will not cause excessive grain growth or other damage.

The 20 per cent silver alloy in this group is used on copper and copper-base alloys, also on steel and dissimilar metals. It has a yellow color, and as it flows freely at 1500 deg. F. it can be used for brazing extruded bronze when reasonable care is taken in heating the joint.

With 30 per cent of silver and above more benefit is obtained from the low melting temperatures due to the silver content and a lower percentage of zinc can be used. Those alloys containing from 40 to 50 per cent silver and from 25 to 16 per cent zinc are probably the most widely used of the silver-copper-zinc group. They are used on ferrous and non-ferrous metals and alloys, and melt at temperatures around 1400 deg. depending upon the exact composition used. An alloy containing 50 per cent silver, 34 per cent copper and 16 per cent zinc is a standard that has become generally accepted in place of a number of other alloys of approximately this composition that were made before the A.S.T.M. standards were established.

High Electrical Conductivity

The alloys in this series which have the lowest melting points contain from 60 to 65 per cent silver and are white in color. Silversmiths use these grades and with 15 per cent zinc they melt at 1325 deg. and are used in other industries for joining small parts and lightweight tubing and sheet.

When even greater ductility is required, the silver can be further increased and the zinc lowered and an alloy containing 80 per cent silver, 15 per cent copper and 4 per cent of zinc is used for joining copper rods that are to be drawn into fine wire and also for making trolley wire.

Silver brazing alloys have a higher electrical conductivity than base-metal brazing alloys and their use is therefore particularly desirable for brazing parts of electrical apparatus where the highest conductivity is required. Zinc tends to lower the conductivity and the silver-copper eutectic previously men-

TABLE I
Standard Silver Brazing Alloys Specifications

Grade No.	Silver, Per Cent	Copper, Per Cent	Zinc, Per Cent	Cadmium, Per Cent	Impurities, Max. Per Cent	Melting Point, Deg. F.	Flow Point, Deg. F.	Color
1	10	52	38	a	0.15	1510	1600	Yellow
2	20	45	35	a	0.15	1430	1500	Yellow
3	20	45	30	5	0.15	1430	1500	Yellow
4	45	30	25	nil	0.15	1250	1370	Nearly white
5	50	34	16	nil	0.15	1280	1425	Nearly white
6	65	20	15	nil	0.15	1280	1325	White
7	70	20	10	nil	0.15	1335	1390	White
8	80	16	4	nil	0.15	1360	1460	White

*The addition not to exceed 0.50 per cent of cadmium to assist in fabricating Grades Nos. 1 and 2 shall not be considered as a harmful impurity.

tioned has about 70 per cent of the conductivity of copper.

Tests by Reed and Edelson showed that with lap joints having a lap one and one-half times the thickness of the copper bar which was joined, the resistance was less than that of the copper bar, and with butt joints the resistance was only increased slightly. The alloy used in these tests contained 50 per cent silver, 34 per cent copper and 16 per cent zinc, and by using an alloy with higher percentage of silver and low zinc the resistance would be less.

Corrosion Resistance

Any of the standard silver brazing alloys are resistant to most of the common types of corrosion. When unusual conditions have to be met it is desirable to make up specimens and subject them to the actual conditions of use in order to determine the best alloy. Galvanic corrosion is a problem but as it is generally in proportion to the areas exposed to attack, a cathodic joining alloy would give the best result. Silver alloys with high percentages of silver are cathodic to many metals and alloys used to resist corrosive conditions, and they are therefore satisfactory for use under such conditions. For example, these high-grade silver alloys are cathodic to Monel metal and stainless steel under many corrosive conditions for which these metals are used. They should not be used, however, for joining stainless steel when the joints are likely to be attacked by nitric acid.

In addition to the standard silver alloys, the engineer has a further selection from the proprietary alloys that have been developed, and the two that were described in previous paragraphs are suitable for a wide variety of applications. Their low melting points have made them very acceptable because of the speed at which joints can be made and the large factor of safety against damage from overheating.

Form of Alloy Important

The question of color match with different metals and alloys is often raised. Those silver brazing alloys with low percentages of silver are yellow and the color becomes whiter as the silver is increased. Alloys without any copper and with high silver are the whitest, but the band of brazing alloy which is visible in a properly fitted joint is so narrow that any slight difference in color is generally a negligible factor.

Having selected the grade of alloy, the question of the form that is best

suiting for any particular application is most important. The malleability and ductility of silver brazing alloys allow them to be produced in any form that will be most convenient and economical to use.

There is a rapidly growing use of inserts of these alloys because by pre-

careful control of temperature.

- (6)—Neatness of joints and no spills of the brazing alloy on the surface away from the joint.

Inserts may be thin sheets, washers, and rings of either round or rectangu-

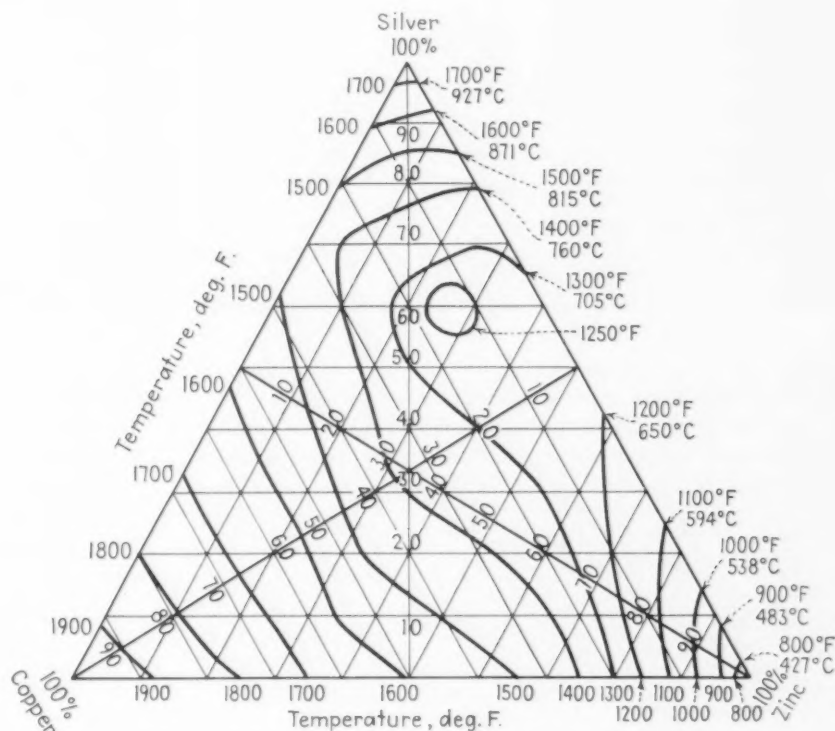


FIG. 1—Liquidus diagram of silver-copper-zinc alloys.

placing them before heating the following advantages are obtained:

- (1)—Control of the amount of alloy used, thus eliminating waste.
- (2)—Better assurance that the alloy will be properly distributed over the joint surfaces and all parts will be wetted.
- (3)—The appearance of the alloy at the edge of the joint is a good indicator that the joint has been heated sufficiently to insure a good bond.
- (4)—In furnace or salt bath heating, inserts are necessary, and it is possible to make up assemblies having a large number of joints that can be heated at the same time.
- (5)—When the heating is done with torches the workman can give his whole attention to evenly applying the flame and

lar wire. Filings or powdered silver brazing alloy can be spread along the joint.

A thin layer of the alloy can be flushed over the joint surface of one of the members before assembling.

The size of wire or strip selected when the workman has to feed it into the joint is not always given the attention it deserves. If wire or sheet of too large a cross-section is used, there is likely to be a waste of the alloy, and if it is too small the workman is inconvenienced by having to feed in too great a length. Care in choosing the right size will result in lowering costs and making better and neater joints.

ED. NOTE:—Next week the author will summarize brazing procedure, including cleaning, fitting assembly and oxy-acetylene heating, and will describe briefly a number of applications in different industries.

Surface Treatment of Steel — *Prior to Painting*

• • •

THE growing demand for structural sheet steel has indicated the need of better protection for the metal through improvement of the durability of paint films to insure longer life. One such method is to treat the surface prior to painting, in order to provide an improved base for the paint; another method is to improve the paint itself. A recent report by R. E. Pollard and W. C. Porter, of the National Bureau of Standards, Washington, is concerned with the first, or pretreatment, method of improvement.

The report is limited to the description of the pretreatment processes tested, and to the discussion of the relative merits of such processes as measured by the protective value of paints subsequently applied and then tested in the salt spray cabinet, accelerated weathering machine, and condensation corrosion cabinet. The panels used were of plain hot rolled, annealed sheet steel; or hot-dip, zinc-coated (galvanized) sheet steel.

The object of pretreating galvanized steel is to improve the surface for painting. For example, paint adherence can be improved by roughening the surface mechanically or chemically or by the deposition of a film, preferably nonmetallic, which improves the bond between paint and metal. It is desirable that the film formed should be one that prevents reaction between the zinc and the paint vehicle and retards corrosion by reason of its insolubility, its inhibitive action, or its reaction with corrosion products to form an insoluble film.

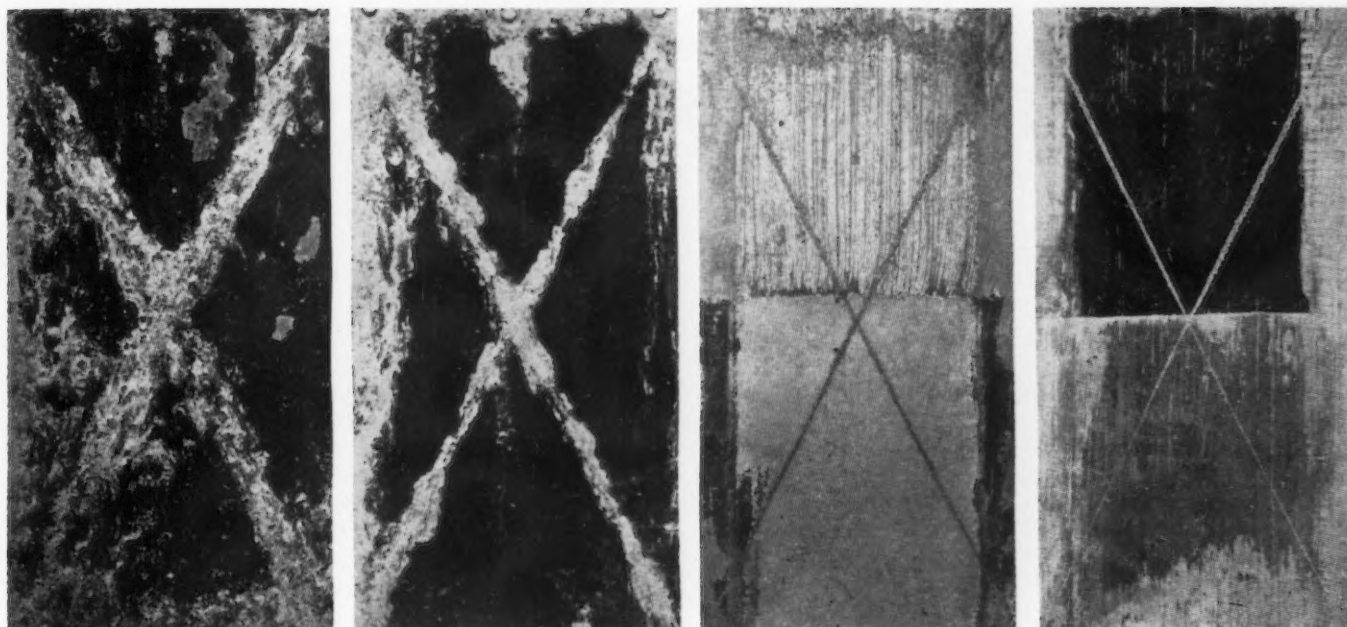
PRETREATMENT PROCESSES FOR GALVANIZED STEEL:

- (A) Untreated hot-dip galvanized surface.
- (B) Proprietary phosphate treatment. Cold wash in aqueous zinc-phosphate solution containing free phosphoric acid and an activating agent.
- (C) Etching solution. Water containing 8 oz. of copper sulphate per gal.
- (D) Etching solution. Water containing 8 oz. of zinc sulphate per gal.
- (E) Etching solution. Alcohol, 60; toluol, 30; carbon tetrachloride, 5; and hydrochloric acid, 5; parts by volume.
- (F) Etching solution. Saturated aqueous solution of nickel sulphate, 10 parts by weight, antimony-potassium tartrate, 0.5 part by weight, neutralized with ammonium hydroxide, made slightly acid with hydrochloric acid, and then diluted to 100 parts by weight with water.
- (G) Etching solution. Alcohol, 4; phosphoric acid (85 per cent), 1; parts by volume.
- (H) Proprietary phosphate treatment. Hot dip in aqueous zinc-phosphate solution containing free phosphoric acid and an activating agent.
- (I) Laboratory etching solution. Dilute acetic acid, 4 per cent by volume.
- (J) Proprietary phosphate treatment. Hot dip in aqueous zinc-phosphate solution containing free phosphoric acid and an activating agent.
- (K) Proprietary oxalate-phosphate treatment. Hot dip in an aqueous solution containing an oxalate and phosphoric acid.
- (L) Proprietary dichromate treatment. Cold immersion in a sodium-dichromate aqueous solution containing sulphuric acid.

The adherence of paint to a clean, dry steel surface is generally very good. An important objective to be sought in any pretreatment process, therefore, is to obtain a clean, dry surface free of rust and loose scale, or to deposit a film having equal or superior adherence, which will prevent or retard corrosion underneath the paint.

PRETREATMENT PROCESSES FOR PLAIN-STEEL SURFACES:

- (Fe) No treatment. Painted over mill scale.
- (Fe-A) Pickled in hot aqueous solution of hydrochloric acid (20 per cent concentrated acid by volume).
- (Fe-B) Proprietary phosphate treatment. Hot dip in an aqueous zinc-phosphate solution containing free phosphoric acid and an activating agent.
- (Fe-C) Proprietary chromate treatment. Hot dip in an aqueous chromic-acid solution containing activating agents.
- (FE-D) Proprietary phosphate-chromate treatment. Cold wash in an aqueous solution containing phosphoric acid, phosphates, and chromates.
- (FE-e) Proprietary phosphate-Chromate treatment. Cold wash in an aqueous solution containing phosphoric acid, phosphates, and chromates—generally used with an inhibitive primer.
- (Fe-H) Proprietary phosphate treatment. Hot dip in an aqueous zinc-phosphate solution containing free phosphoric acid and an activating agent.
- (Fe-K) Proprietary oxalate-phosphate treatment. Hot dip in an aqueous solution containing an oxalate and phosphoric acid.
- (Fe-M) Proprietary phosphate treatment. Cold wash in an aqueous



A-1

L-1

A-1-w

L-1-w

COMPARISON of salt spray and accelerated weathering tests on galvanized steel panels subjected to acid-dichromate treatment (L) prior to painting. Panel A-1: untreated galvanized surface (A), two coats primer; salt spray, 28 days' exposure. Panel L-1: acid-dichromate treatment (L), two coats primer, salt spray, 61 days' exposure. Panel A-1-w: untreated galvanized surface (A), two coats primer, white top coat upper half; accelerated weathering, 8 months' exposure. Panel L-1-w: acid-dichromate treatment (L), two coats primer, black top coat upper half; accelerated weathering, 6 months' exposure.

solution of phosphoric acid containing a wetting agent.

(Fe-P) Pickled in hot aqueous solution of phosphoric acid (10 per cent sirupy acid by volume).

(Fe-S) Pickled in hot aqueous solution of sulphuric acid (20 per cent concentrated acid by volume).

Results

GALVANIZED STEEL PANELS:

A number of accelerated-weathering, salt-spray, and condensation corrosion tests were made on painted galvanized sheet-steel panels. The results of these tests, insofar as they were affected by surface treatment of the material, may be briefly summarized as follows:

(a) The hot-dip phosphate treatments (H and J) and the cold-wash phosphate treatment (B) improved both the adhesion and the corrosion protection of paints under widely varying conditions. The hot-dip treatments apparently were slightly superior to the cold wash.

(b) The acid-dichromate treatment (L) apparently had considerable protective value in itself and had an inhibitive action under paints but did not improve their adherence.

(c) The oxalate-phosphate treat-

ment (K) prolonged the protective value of inhibitive paints under severely corrosive conditions (salt spray) but had little effect on other types, and did not improve adhesion to any appreciable degree.

(d) All other pretreatments tested were found to have slight or negligible effect in improving the protective value of paints.

(e) Tests of other types of zinc-coated materials are being conducted but have not progressed far enough to warrant conclusions being drawn. These materials include zinc-plated, zinc-sprayed, and annealed hot-dip galvanized surfaces.

PLAIN-STEEL PANELS:

Salt spray tests of painted steel panels included at least two types of paint for all surface conditions listed. Accelerated weathering tests included at least one paint for all pretreatments.

The results of these tests may be briefly summarized as follows:

(a) The hot-dip phosphate treatments (Fe-D and Fe-H) markedly improved the protective value of paints in both tests.

(b) The phosphate-chromate cold-wash treatments (Fe-E and Fe-D) were only slightly inferior to the hot-

dip phosphate treatments in improvement of paint protection.

(c) The hot-dip chromic-acid treatment (Fe-C) improved paint protection as compared with a plain pickled surface, but the improvement was not as marked as that obtained with the treatments mentioned above.

(d) All other treatments tested were found to have slight or negligible effect in improving the protective value of paints. This includes various types of plain pickled surfaces but does not include a type of pickling which is said to result in the deposition of a phosphate film.

(e) Tests to determine the effect of mill scale on the protective value of paints in short-time tests have not been completed. However, some of the pretreatments, particularly those mentioned under (a) and (b), have given good results either over mill scale or on scale-free surfaces.

(f) Under severely corrosive conditions (salt-spray test) the protective value of paints applied on rusted surfaces was decidedly inferior to that of paints applied on plain pickled surfaces. Some of the pretreatments apparently were able to remove light rust. However, they improved paint protection much more effectively when used on a rust-free surface.

What's New in Small

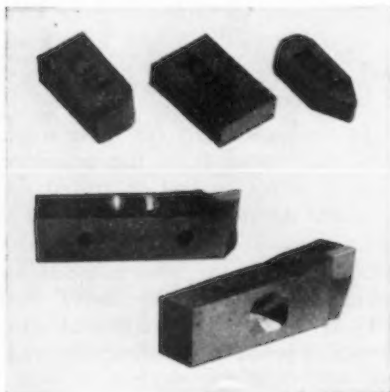
ANNOUNCEMENT has been made by the *Wesson Co.* of Detroit of a complete line of standard carbide cutting tools, including reamers, shell reamers, core drills, end mills, counterbores and inserted blade milling cutters. They are produced by a process involving a new treatment of shanks and bodies whereby the hardening temperatures do not injure the bond or the carbide insert. Manufacturing economies resulting from the combination of large volume production and the new process make possible prices on these standard tools which are said to be lower in some



cases, particularly the larger sizes, than the price of corresponding high speed steel tools. Lowering the initial cost of carbide tools thus enables ever greater savings to be made in the cost per piece, heretofore due to the much longer tool life and the higher cutting speeds possible.

New Carbide Alloy

KENNAMETAL K3H is the designation given a new grade of tungsten-titanium carbide alloy that combines unusual hardness with great toughness, according to the manufacturer, *McKenna Metals Co.*, 144 Lloyd Avenue, Latrobe, Pa. It has a hardness of 79 Rockwell C and a strength of 210,000 lb. per sq. in. on the trans-



verse rupture test. Grade K3H is recommended by the maker as a tool tip material for light finishing cuts and for fairly heavy continuous cuts on steel of all hardnesses up to 550 Brinell. Tool tips of this material are supplied in the three standard shapes shown at the top of the illustration or in special shapes or brazed to shanks. Because of its extreme hardness, K3H grade has unusually long life between grinds. The boring tools shown produced 200 to 225 pieces per grind in machining carburized SAE 1020 steel at the rate of 406 ft. per min.

Curled Chip System

CUTTING rates far beyond anything heretofore believed practical with metal cutting saws are claimed for a new line of power metal cutting saws, identified as a group under the classification, Atkins curled chip system of metal cutting, announced by *E. C. Atkins & Co.*, 402 S. Illinois Street, Indianapolis. First introduced last year in a line of power

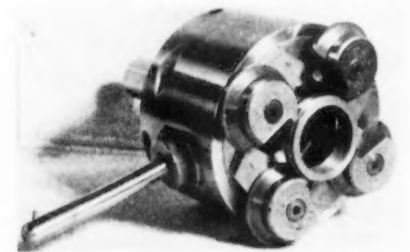


hacksaw blades, the system has now been extended to include Atkins metal milling saws, featuring the radial side clearance grind; segmental inserted tooth cold saws, featuring high speed steel cutting edges with a backing of alloy steel, and metal cutting band saws. The new tooth, formed with an inward curved cutting edge, produces a curled clock-spring-like chip such as the ones shown in the illustration. After the tooth digs in, the chip is kept rolling as a single piece within the curved contour of the gullet. When the tooth reaches the end of the kerf, the curled chip springs free. It is claimed that no broken chips are carried through the kerf a second time

to jam in the gullet or retard clean cutting action. Thus heavier feeds and faster speeds become practical. Other improvements characteristic of the new curled chip line of saws are a large size gullet, and buttressed tooth construction, adding greatly to tooth strength.

Hollow Milling Cutters

SINCE its introduction of self-opening die heads with circular ground thread chasers, the *National Acme Co.*, Cleveland, has developed a complete



line of end turning, end forming, combination turning and threading cutters of the circular form tool type for use in its standard circular chaser die heads. Typical examples of hollow milling applications of these double duty heads are valve stems, formed gasket seats, upset pipe and a wide class of work having several body diameters, round nose ends, etc. Circular form tools for reaming, facing, beveling or chamfering operations may also be inserted in the heads.

Standard heads equipped for hollow milling have the same construction as for threading, but require different holding blocks. The end cutters, like chasers, are adjustable for diameters. These heads are supplied for both revolving and non-revolving spindle machines for standard and special applications in sizes from $\frac{1}{4}$ in. to $13\frac{3}{4}$ in.

Stellite Roll Application

TEN years ago, the *National Telephone Supply Co.* installed some stellite straightening rolls on wire forming machines because the steel rolls formerly used gave a life of only four months. Only last February had

Tools and Cutters

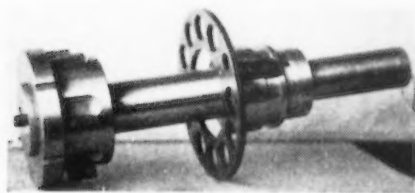
By FRANK J. OLIVER

The Iron Age
Associate Editor,

these original stellite rolls worn enough to require replacing. The material straightened was tempered high carbon steel wire, 0.223 in. in diameter, with a flat on each side. At the end of the first year, the stellite rolls had worn only 0.001 under size; at the end of five years, only 0.003 in. when they were returned to service for another five years.

Large Size Tap

ILLUSTRATED is a special 8 in. Geometric class S collapsing tap recently built by the *Geometric Tool Co.*, New Haven, Conn., for cutting a



range of sizes from 8½ to 10 in. diameter, 8 th. per in. The tool is a lengthened tap equipped with roller pilots for deep hole tapping in massive castings used in marine equipment. Another feature is the use of a special adjusting ring which makes possible the employment of roughing and finishing cuts with the one tool. Otherwise the tap is quite similar to a standard class S tap.

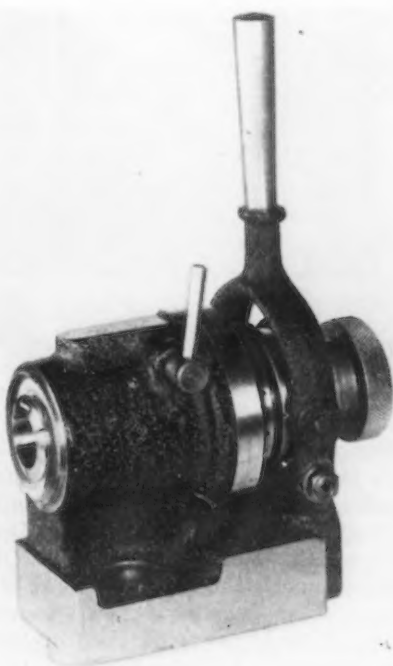
Collet Index Fixture

THREE new collet index fixtures suitable for production work have been placed on the market by *Hardinge Brothers, Inc.*, Elmira, N. Y. One is a horizontal type, the second a vertical type, both illustrated, and the third a combination horizontal and vertical collet index figure. Like the plain horizontal index fixture introduced two years ago for toolroom work, all three fixtures take a standard 5C Hardinge collet with 1 in. round collet capacity or under and have a 24-hole index plate with a range of 2, 3, 4, 6, 8, 12 and 24 divisions; however, the collet is open and closed with a lever instead of a draw spindle handwheel. The lever collet closer saves time, reduces wear on the draw spindle and

NEW developments in cutters include further standardization of carbide tipped tools and the extension of a new form of tooth to metal cutting saws of various types. Circular form tools are being applied to hollow milling cutters. Other items recently placed on the market are collet index fixtures, new grinding wheels and honing stones, live centers, work supports, continuous file chains, magnetic blocks for holding odd shaped pieces, torque indicating wrenches and hydraulic feed and coolant pumps.

collet threads and assures uniform collet tension.

In the horizontal type, the index pin is operated by the small lever on top of the fixture and indexing is done by the knurled handwheel at the right. In the vertical fixture the spindle has



an upper lever for rapidly positioning the spindle when indexing. Below it is the index pin release lever and to its left the collet release lever. The combination fixture is similar to the vertical fixture, with the addition of a vertical side which becomes the base when used in the horizontal position. It also has an index plate arranged



with means for preselecting any hole or combination of holes to be indexed, making it particularly suitable for production work.

Special Grinding Wheels

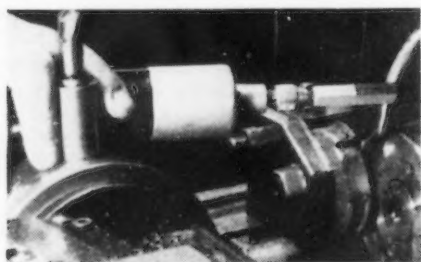
FOUR new types of grinding wheels designed for specific applications have been introduced by the newly formed *Atlantic Abrasive Corp.*, 512 Pearl Street, South Braintree, Mass. Atlantic type L.B., for fast, clean cutting on tools and dies, uses a synthetic bond to eliminate heat and prevent clogging or glazing. The wheel comes in all grain sizes from coarse to fine. Type S.B., also supplied in all grain sizes, is a medium tempered wheel for grinding all fine tools made of high speed steel, stellite and cemented carbides. It is said to permit maximum working speed and pressure without danger of burning.

Atlantic type L.A. is a hard tempered wheel for general use on aluminum, copper, zinc, brass, iron, steel and stellite. Wheels made in the finer grain sizes of this type are suitable for precision grinding. Type S.C. is a soft tempered wheel, made in all grain sizes, designed for fast, clean

grinding of alloy metals, including stellite, carbides and other alloyed steels. The same type of bond is used as in type L.B. to prevent glazing or burning.

Lapping Tool for Carbides

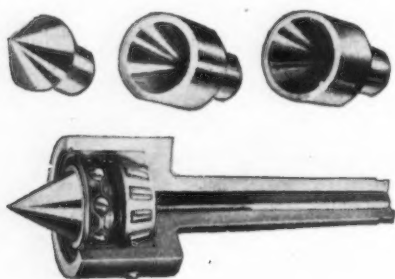
DIAMOND lap hones for dressing carbide tipped tools without disturbing the machine set-up are now available for the reciprocating Multi-Purpose tool, manufactured by the *H & H Research Co.*, 1925 Buena Vista, Detroit. The diamond laps come in any grit from rough cut up



to 500 grit, 1/32 or 1/16 in. thick and 1 in. long on the face of the lap. In the photograph the tool is shown dressing a circular form tool in an automatic screw machine. The short reciprocating stroke of the Multi-Purpose tool, either 1/8 or 7/16 in., makes it practical to get in any place that can be reached by a hand stone to touch the rough edges of a carbide tool.

Live Center

THREE inserts are available for a live center introduced by the *Ideal Commutator Dresser Co.*, 1925 Park Avenue, Sycamore, Ill., namely, male insert for work already centered; plain female insert for uncentered work, and a female insert with three raised lands for uncentered work having a flat or burred keyway, the last two for work from 1/8 to 3/4 in. in diameter. All parts of the center are hardened and ground. A ball bearing is used in combination with a tapered roller bearing, sealed from dirt and chips. Center is supplied in seven capacities to take care of thrust and radial loads ranging from 250 to 600 lb.

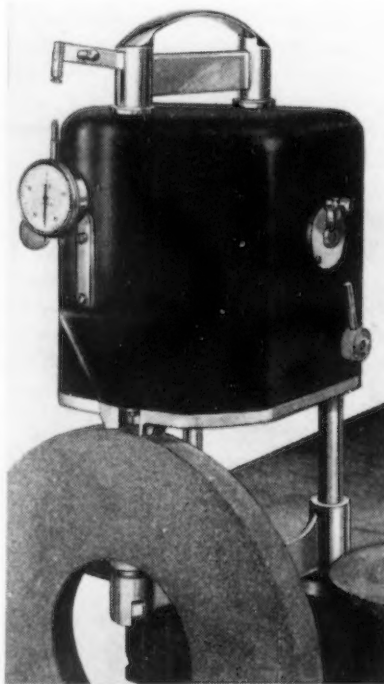


Superfinishing Stones

ABSOLUTE control of the depth of scratches in superfinishing and high speed honing is claimed for a new line of stones developed by the *Mid-West Abrasive Co.*, Detroit. The process by which the stones are made eliminates the possibility of several grains adhering and causing an uneven finish. Each grain is separate and acts as an individual polishing unit. Further claims made for this product are: that it cuts faster, wears longer, and because of the uniformity of the stones, there are no "throw aways." These new stones are available in all shapes, sizes or cutting qualities desired.

Grading Meter for Grinding Wheels

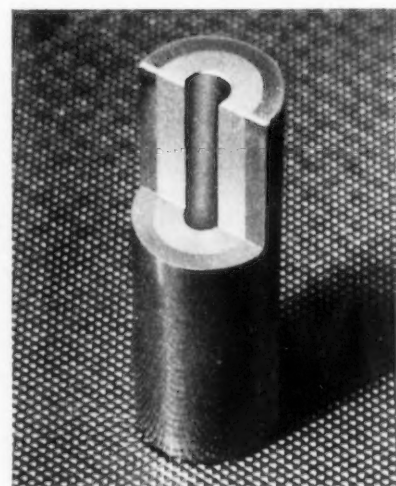
ABOUT ten years ago the *Abrasive Engineering Corp.*, 15947 Turner Avenue, Detroit, introduced its type L Gradeometer for giving a comparative reading of the strength or grade of bonding substances in grinding wheels. While the instrument has been in use in some of the larger man-



ufacturing institutions in this country and abroad, the high price has prevented its general use in industry. A few months ago the company brought out the portable type P Gradeometer, illustrated, selling at about one-eighth the price of type L unit. The smaller unit is calibrated with the larger machine and will accurately grade grinding wheels of practically any size. It enables much closer control to be obtained over grinding wheel selection and offers a means of checking the uniformity of bond hardness.

Work Supports

WORK rests for supporting work in machine tools and other metal working machinery are now supplied with Kennametal inserts by the *McKenna Metals Co.*, 144 Lloyd Ave., Latrobe, Pa. Because of the unusual hardness of Kennametal (76 to 78



Rockwell C), such work supports have long life and assure accurate positioning of work. These work supports are made to specification in any practical length, diameter and bore. The illustration shows a cutaway view of a typical unit used to support a pinion in an automatic screw machine. In this instance, the work support is 1 1/2 in. long with 1/2 in. outer diameter.

Continuous File Chains

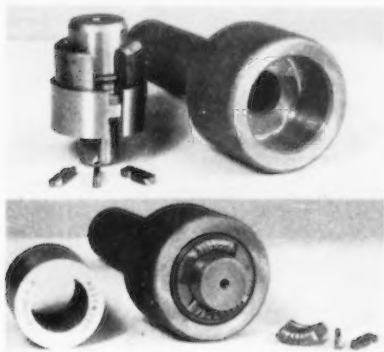
PERFECT alinement of files and overlapping of the ends in such a manner as to prevent chipping of the file teeth at this point are features of an improved system worked out for its continuous filing machines by *Grob Brothers*, Grafton, Wis. Into the ends of the files on the rear side, small slots are milled that closely fit into projections of the chain links behind the files. Thus as the files enter into a straight line path after leaving the pulley, they are locked into alinement with the chain, which is closely guided by supports in the working zone. The overlapping feature is obtained by cutting the files at an oblique angle instead of using an irregular shape. Chip clearance is provided as



heretofore by having the file chain guide slightly deeper than the depth of the chain so that no amount of file chips can do any harm.

Marker for Annular Parts

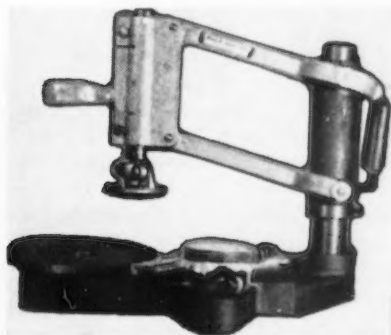
ELIMINATION of the usual set-screws required to hold movable type in place is a feature of a new marking device for marking annular parts like gears and bushings, made by the *New Method Steel Stamp Co.*, Detroit. The type is assembled around a central flanged shaft and is held in place with an outer spring steel split sleeve. A hardened and ground annular anvil disk bears against the flange on the shaft and a snap ring in a groove on the shaft is used for locating the type during assembly. The whole assembly is carried in the type body holder shown, and is held by a setscrew. The end of the central



shaft extends beyond the type holder to act as a locating pilot.

Hand Etching Machine

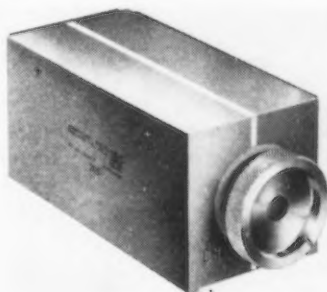
THE unit illustrated will etch names, numbers and symbols on polished, hardened surfaces, such as ball bearing races. Etching stamps can be furnished for any special trademark or name that is to be transferred to metal. The bench machine shown is the smallest size, handling work up to 6 in. diameter by 3 in. thick. The handle is in a convenient position to



allow the operator to wet the stamp on the acid soaked pad and then make the impression. This unit is made by *Benjamin E. Jarvis, Inc.*, 74 Malvern Street, Newark, N. J.

Permanent Magnet Block

USEFUL for toolmaking, inspecting or manufacturing of many small jobs that ordinarily require spe-



cial clamping arrangements is the *Brozen & Sharpe* toolmakers' magnetic block No. 760. It has a working surface $2\frac{1}{2} \times 5\frac{1}{4}$ in. and is of the permanent magnet type. When the knurled control wheel is turned to "on," the magnetic flux passes through the work and holds it to the work surface. When turned to "off" position, the magnetic flux completes its circuit within the block. The only moving part is the magnet, said to retain its holding power indefinitely. The working surface and the base of the block are ground parallel and the back end is ground square with the working surface.

Magnetic Block Sets

THE *George Scherr Co., Inc.*, 128 Lafayette Street, New York, has placed upon the market a new product, *Magne-Blox*, a set of magnetic



parallels and V-blocks for use with magnetic chucks. Made of alternate laminations of brass and specially selected iron of high magnetic capacity, the set consists of two parallels measuring $1 \times 1\frac{3}{4} \times 3\frac{3}{4}$ in. and two V-blocks measuring $1\frac{3}{4} \times 2\frac{3}{8} \times 1\frac{7}{8}$ in.

furnished complete in hardwood case. The set is intended especially for surface grinding operations on odd shaped pieces, which cannot be held directly on the face of the magnetic chuck. The parallels and V-blocks are placed on the magnetic chuck and obtain their magnetic properties directly from it. The company has also brought out a universal *Magne-Blox* angle iron consisting of a series of steps measuring in width $\frac{3}{16}$, $\frac{3}{8}$, $\frac{1}{2}$, $1\frac{5}{16}$ and $1\frac{5}{8}$ in., upon which may be placed all manner of special pieces for surface grinding without the use of complicated clamps and attachments. Overall dimensions are $3 \times 3 \times 7\frac{1}{2}$ in. With the use of a sine bar or protractor, work requiring grinding operations at various angles may be laid out and fastened to the side of the angle iron.

Alloy Wrench Inserts

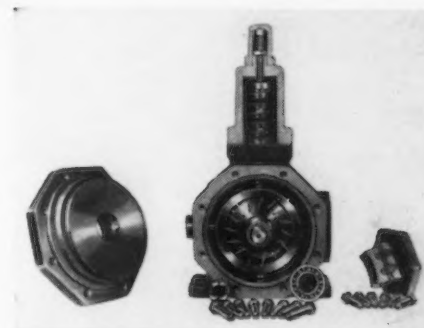
WHILE the best-known uses of Haynes-Stellite cobalt-chromium-tungsten alloys are as metal-cutting tools and hard-facing rods, many special castings are made from these alloys for corrosive and abrasive serv-



ice. An interesting special casting has been developed for the use of an automotive manufacturer. It is an alloy insert used in the gripping sockets of pneumatic speed wrenches for tightening bolts on the assembly line. Shown here is an insert for a $\frac{3}{4}$ -in. hexagon wrench. Such inserts are made by *Haynes Stellite Co.*, Kokomo, Ind.

Variable Volume Pump

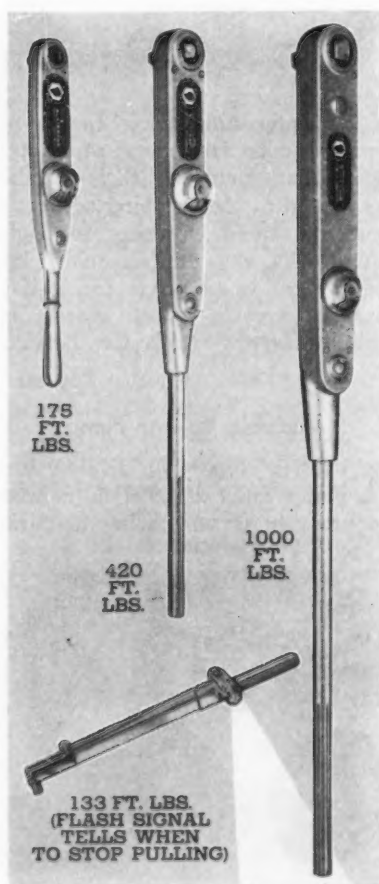
AVANE type variable volume pump rated at 1000 lb. continuous pressure is now being manufac-



ture, by the *Racine Tool & Machine Co.*, Racine, Wis. Compared with the 500 lb. pressure pump made by the company for several years, this new model has a shaft of much larger diameter with wider needle bearings, and a ball thrust bearing has been added. Oil seals of a mechanical self-compensating type replace a packing seal. Vanes and rotors are hardened and ground, and the vane slots are now slanted away from the direction of rotation, permitting the use of deeper and stronger vanes. Pressure chamber ring is an accurately ground steel ring which imparts a smooth harmonic action to the vanes. Hydraulic balancing of vanes is now accomplished by improved porting of the side plate. These new models are of the same overall dimensions as the former 500 lb. pumps and are interchangeable in the field. Various combinations of controls are furnished.

Torque Indicating Wrenches

FOUR models of torque indicating wrenches, having maximum capacities of 133, 175, 420 and 1000 ft.-lb., are now available from the *Blackhawk Mfg. Co.*, 5325 W. Rogers Street, Milwaukee. The 133 ft.-lb. Torkflash, featuring a flashlight signal, was brought out last year and has



a choice of 7/16 or 1/2 in. socket drives. The three larger sizes recently announced have 1/2, 3/4 and 1 in. socket drives respectively. They feature a new Stay-Set dial which magnifies the deflection of an inclosed spring steel shaft 26 times and remains at maximum torque setting after tension is released. Dial is reset by turning a knob. These tools permit all bolts to be tightened uniformly to a predetermined tension.

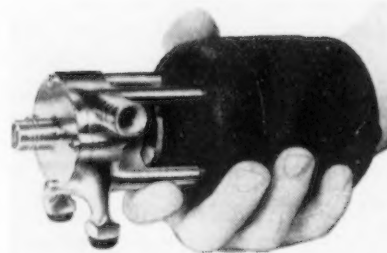
Small Coolant Pump

MODEL P-3 Gusher coolant pumps are being made by the *Ruthman Machinery Co.*, Cincinnati, in various types and capacities for use on small lathes, grinders, honing and lapping machines, automatic lathes and to larger machines requiring only a moderate volume of coolant. The essential features are a built-in motor, rugged vertical shaft suspended on precision ball bearings, double suction intake and balanced impeller. They have no packing nuts, foot or relief valves and require no priming. Cooling air is drawn down through the motor from the top through vents covered by a canopy. For light duty, where soluble coolants are used, the model P-3 is equipped with a 1/30-hp. single phase motor, but for continuous duty or where oils of various viscosities are used, a 1/10-hp. motor is available for operation on d.c. or two and three phase a.c. The latter pumps deliver from 2 to 10 gal. per min. against a 5-ft. head, depending upon the oil viscosity and the pipe size.



Centrifugal Coolant Pump

DEVELOPING a maximum pressure of 20 lb. per sq. in. and maximum volume of 8 gal. per min. is a midget centrifugal pump, made by the *Eastern Engineering Co.*, 45 Fox Street, New Haven, Conn. Known as model E, it is powered by a universal heavy duty, fan cooled 1/20-hp. motor, weighs 6 lb. and is 7 1/2 in. long by 3 3/4 in. square. Model E is offered as standard in monel metal, stainless steel and chromium plated bronze construction. The company is also marketing a larger, model D unit,



powered by a split capacitor type motor.

High Spot Bluing Paste

TO overcome the difficulty of removing Prussian blue that has dried on work left overnight, the *Dykem Co.*, 2301 North 11th Street, St. Louis, has developed a non-drying paste known as Hi-Spot Blue No. 107. It is smooth and soft, free from grit, intensely blue in color and is said to be uniform from batch to batch. A thin coating of this paste remains wet and transferable on the master or bearing surface indefinitely, thus saving the time of the scraper hand in cleaning up the master at night, and rebluing the next morning. The material is particularly useful in scraping large flat bearing surfaces on lathes, planers, milling machines and other machine tools. Dykem Hi-Spot Blue is supplied in collapsible tubes.

Wick Feed Oiler

INTEENDED for use on machinery that operates intermittently is a visible, unbreakable wick feed oiler made by the *Trico Fuse Mfg. Co.*, 2948 North 5th Street, Milwaukee.



When the oil is filled above the point where the wick enters the center tube, the surplus oil flushes the bearing. Thereafter, oil is fed by capillary action when the top lever is in the vertical position. Bottle is made of an unbreakable transparent plastic and comes in 1, 2 and 4 oz. capacities.

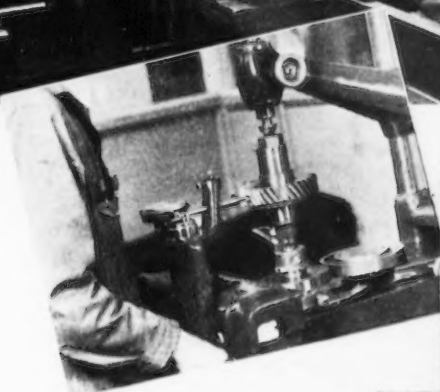
To Assure PRECISION GEARS...

for MILWAUKEE MILLING MACHINES
... TWO COMPLETELY EQUIPPED
GEAR LABORATORIES

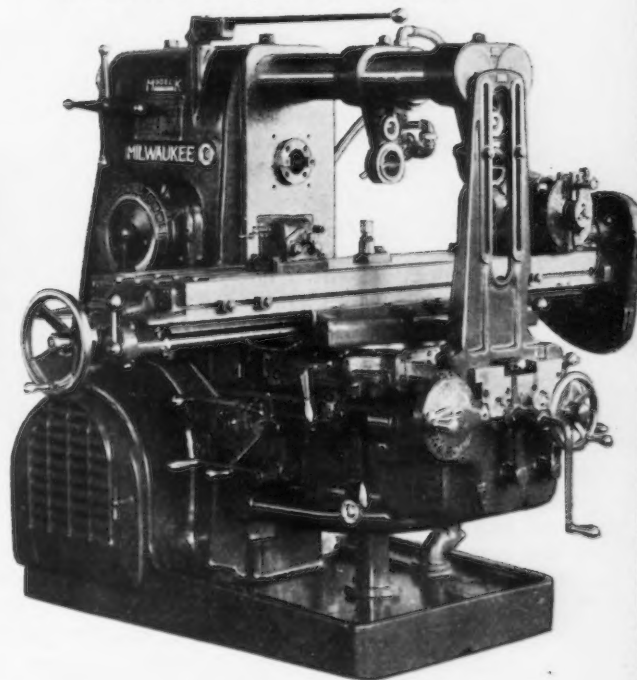
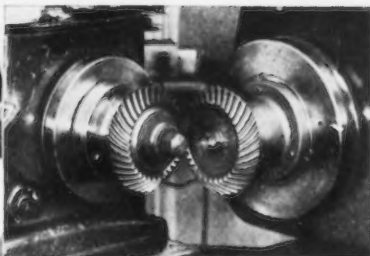


PRECISION gears are vital to the sustained accuracy and performance of milling machines. Cut to exacting tolerances by the finest and most complete equipment obtainable, gears for Milwaukee Milling Machines must, in addition, pass precision tests for profile, lead, bearing, involute, runout, radial and silent operation. Two completely equipped gear testing laboratories are synchronized with production operations to guarantee the fullest measure of accuracy.

KEARNEY & TRECKER CORPORATION
MILWAUKEE, WISCONSIN



Gear laboratories and three of many precision tests in the production of gears for Milwaukee Milling Machines.



KEARNEY & TRECKER
CORPORATION

Milwaukee **MILLING
MACHINES**

DETROIT — Unforeseen developments in the U. S.-British - Ford - Packard-Rolls Royce engine deal are pretty well illustrated by the strange events that occurred on the Tuesday evening when William S. Knudsen, of the National Defense Commission, finally announced that negotiations with Ford had broken down. With the whole country in a questioning mood and with shouts of "saboteur" ready to burst in British legislative halls from Ottawa to London, Henry Ford calmly accepted from the British Institution of Mechanical Engineers the James Watt International Medal, one of the most important honors in the engineering world.

It was an honor which, in the normal course of events, would have been presented to him in London, with the King or a royal prince in attendance. Because the intervention of threats of the present war prevented a planned visit of Ford to England last summer, Henry Ford received the medal from the hands of his old friend and his former employer, Alex Dow, at a private dinner in the Detroit Club on the night in question.

The 2-in. gold disk, emblematic of high British engineering regard, has been awarded only to men, and Ford is the only living holder of it. The first holder of such a medal was Sir John Aspinall (1936), who was selected, like Ford, from among nominees named by the mechanical engineering groups in 18 industrial nations of the world. The institution, in naming Ford, paid tribute to the progress in manufacturing methods which he has introduced. It also cited his genius for exploitation, administration and organization which has built up the largest industrial organization under a single owner which the world has ever seen.

Will the Citation Be An Offset

FORD'S refusal to manufacture a single engine in his American plants for British war use, on the one hand, and his receipt of high British honors on the other, poses a neat question which time alone will answer: Will the immediate reaction to his interpretation of war-time ethics outlive the measured words of the engineering citation?

Packard's receipt of a contract for airplane engine manufacture has been long anticipated and, as in the case of Ford, has an extensive background. A big factor in making the World War Liberty engine, this firm continued important in the aircraft engine field during the first half of the '20s with a V-12, an inverted V-12 and an X-24 engine that did yeoman service in military

On The Assembly Line

BY W. F. SHERMAN

Detroit Editor

• Ford given James Watt medal by British following the Rolls-Royce controversy . . . Packard gets Ford company's cooperation in plans to produce plane engines for England, may spend \$30,000,000 for expansion

planes and racing craft. Its efforts during those years, essentially a continuation of the Liberty engine on another scale, persisted until the radial engine swept into popularity and Packard, unsupported by the military services, without the limitless funds that must go into the development of fine engines, had to give up the effort. In the '30's, Packard continued to show its interest and the ability of its engineers when it fostered the radial diesel engine, putting its funds liberally into this project until its key man and most inspired designer, Captain Woolson, died in a crash.

More recently Packard has revived its aircraft and affiliated marine engine efforts and is known to have hoped for government acceptance of later-developed engines. Basis for such

hopes was the recent military interest in V-type and pancake engines. A new kind of valve system and valve train mechanism have been Packard special projects upon which the organization planted hopes for further participation in the aviation business.

Meanwhile, the Packard marine engine division really has played an important role in supplying the Navy with V-12 power plants which will deliver more than 1400 hp. These, incidentally, have their origin, too, in the Liberty design, and look surprisingly like the originals. They have gone through an evolutionary process, of course, from the V-12 post-War design which delivered 600 hp. Gar Wood used them in international speedboating against the best that England, Italy and France had to offer. He got successive power increases out of them by refining and supercharging until they delivered 1500 hp. or more. Durability was proved greater than that of Europe's finest. Little thought was given at that time, however, to the possibility that these high output engines could withstand the punishment of a 24-hour run on the test stand, as they have been required to do for acceptance for Navy use.

Packard is in production on these engines now, apparently having filled the U. S. order for 86 and now being engaged in supplying similar engines direct to Britain.

A Mass Production Job

THERE can be no analogy between Packard's method of producing a few hundred marine engines and the tooling that must be done to turn out the Rolls Royce engine in mass quantities. In the marine engine setup there is hardly any equipment that rates as mass production machinery or tooling. A group of screw machines making parts is the closest

GET ALL **3** in Forging Aircraft Parts:

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Upset forging produces an ideal grain flow and fiber distribution resulting in greater strength and uniformity of physical structure which assures freedom from flaws and prolonged service life.



Aircraft pistons and cylinder barrels upset forged on Ajax Forging Machines.



Upsetter dies developed for forging aircraft cylinders.

This Ajax 8-Inch Forging Machine is designed to accommodate dies 46 inches in height, permitting as many as four progressive operations on large stock in fabricating heavy duty forgings.

TAKE the offensive in stepping up production and reducing production costs on aircraft cylinders, crankshafts, pistons, flanged propeller shafts, hub flanges of propeller blades, and numerous other aircraft parts.

Abundant power of Ajax Air Clutch Forging Machines and their instantaneous response to effortless tripping step up production of upset forgings—make possible completion of many multi-operation forgings at a single heat, which would otherwise require reheating. Unyielding rigidity of the one-piece, solid steel frame withstands tremendous pressures of gripping and heading, resulting in unusually accurate die and tool alignment, and consistently uniform, accurately matched forgings.

The Ajax 8-inch Forging Machine illustrated handles a wider range of heavy forgings of difficult shapes to an accuracy of dimension, formerly believed to be impossible, and produces forgings for usual industrial use as well as for aircraft, ordnance, navy and diesel construction. Write for Bulletin 65-A, describing sizes 2-inch to 7-inch.

THE **AJAX**

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NEW LONDON, CONN.

that the setup comes to meeting the definition. Necessarily, the shop is operated very much as a tool and die shop would be, with standard lathes, planers, milling machines and boring mills doing the major part of the work. Some high precision jobs are set up on jig borers or on a small Keller machine. The marine engine must be classified as a custom-built power plant.

In launching into mass production of the Rolls Royce, Packard has obtained ready cooperation from Ford Motor Co. Even before the public announcement had been spread that Packard would get the U. S. and British orders, it was known in Detroit that Ford had stopped tooling and that all preliminary studies made by Ford tool engineers were being turned over to Packard. That happened on Wednesday before the Fourth of July.

May Need New Plant

Now Packard faces the necessity of raising large sums for expansion and tooling, more than doubling its personnel, and probably building a new plant. Money must be raised, because Packard finances hardly would withstand the immediate cash outlay that will be required. This has been estimated at \$30,000,000. Employment, in the months that Packard will require to tool up, must be increased from 10,000, the present figure, to about 24,000, it has been announced. Most of the additions must be skilled workers who will be difficult to find at this time in this area. A training program of some kind is indicated. Then there is the matter of floor space. Despite a reported

statement that the company has enough building space, informed opinion and long acquaintance with the organization would indicate that more is required. When Packard added new lines of cars in recent years, it was forced to utilize large floor areas, and did so very efficiently, using almost every available square foot of floor. The firm boasted less than a year ago of its high output per square foot. This leads to the conclusion that an early step will be to erect a new plant, possibly on the outskirts of the city.

May Result in Delay

It is not at all derogatory to Packard, which has proved its mettle many times, to say that there are unfortunate aspects to the developments which have stopped the Ford program after it had gone so far in the direction of tooling for the Rolls Royce engine. As stated in this column previously, Ford has 16 months' background experience with this particular engine and the French Hispano Suiza. Plans were at such a stage that production could easily have been under way in six months, instead of the ten months it will now take. An indication of the projected Ford schedule is given in the fact that machine tool builders who were slated to get Ford orders had been told that deliveries were expected from all machine tool builders within four months, with five months established as the maximum allowable in any case.

Ford May Be Called

There remains, of course, the question of whether Ford may be

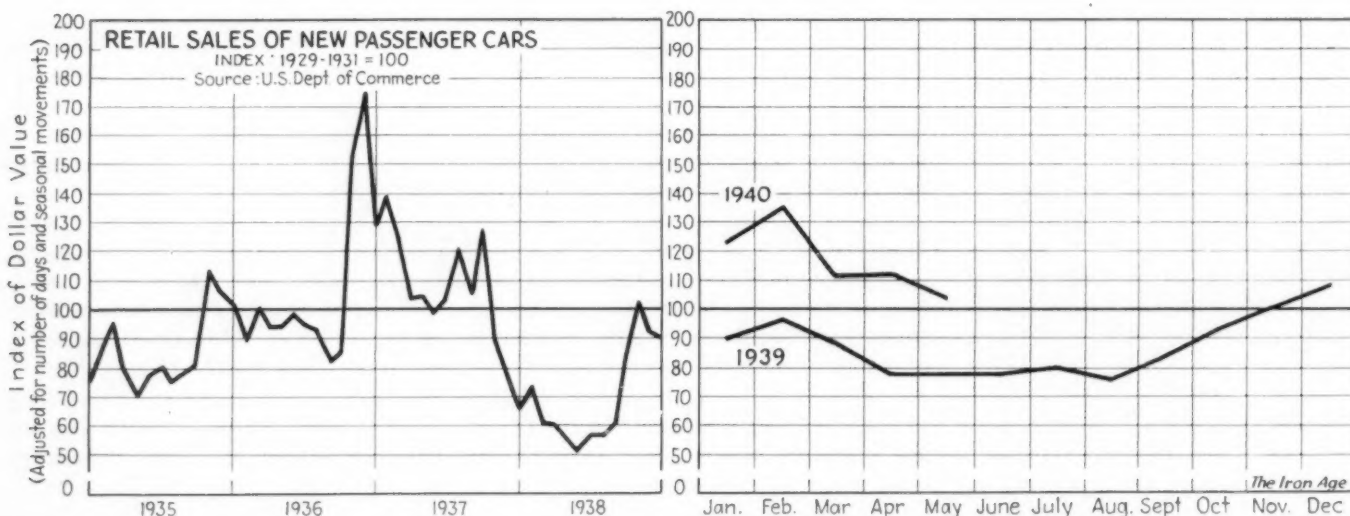
called into the program at a later date by the Government. There is no indication of immediate plans for anything of the sort.

Meanwhile, there have been new developments at Chrysler, it is indicated. De Soto is believed to be interested in a proposal to manufacture tanks or tank parts, while the Dodge division is investigating manufacture of engines and transmissions for tanks. This is the first indication that tank manufacture in automobile plants is contemplated—under original industrial mobilization plans this type of vehicle was not considered easily adaptable to automotive production systems.

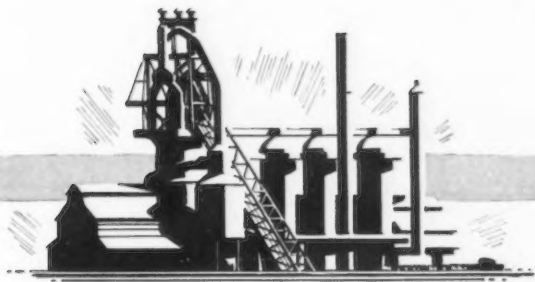
Holiday Cuts Production

Automobile production was cut sharply by the July 4 holiday. The total for the last week is only 51,975 compared with 87,550 in the previous week and 42,784 in the corresponding week of last year, according to Ward's Automotive Reports. All the plants in the industry, except Buick, curtailed operations to three days during the holiday week. Buick reopened Friday but it was anticipated that this would be nearly the final day of operations in that plant.

Several additional companies have completed their 1940 production season and are changing over for new models. Others in the industry are in the last phase of their current campaign and will be shutting down soon. However, a rebound in production for the current week is anticipated as Chevrolet and Ford resume substantial production for a few weeks more.



DON'T LET *Construction* SLOW UP *Production*



WITH the demands made on the steel industry today, the diversion of executive effort from production into construction supervision is a doubtful economy. The valuable time consumed in contacting and supervising numerous sub-contractors can be released for more profitable uses.

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WASHINGTON — A check-up on recent steel purchases made by the War, Navy and other government departments showed this week that, although the minimum steel wage determination under the Walsh-Healey Public Contracts Act was invoked on May 28, steel companies, including those in the East which unsuccessfully contested the prescribed wage minimum, have thus far been little affected by the order.

Government sources who keep close watch of steel purchases advanced the explanation that there have been few steel bids invited since that date; and that steel contracts awarded during the past seven weeks were not covered by the steel wage order, the bid invitations having been sent out prior to the effective date of the order.

Officials added, however, that with the acceleration of the defense program bids for steel will be asked with increased frequency, and that steel companies now paying a common labor rate below the prescribed minimum will have to increase the rate in order to be eligible for government business.

The Walsh-Healey steel wage order, prescribing minimum rates of pay ranging from 45c. in the South to 62½c. in the Chicago, Youngstown and Pittsburgh districts without recognizing a differential for plants in the Eastern area, became effective on May 28 after the Supreme Court upheld the validity of the steel wage determination made by the Secretary of Labor.

After the wage order had been sustained by the high court, it was generally expected that the small Eastern steel mills which had contested the action in court would ask government purchasers of steel to petition the Labor Department for exemption from the minimum wage regulations on the ground that these were prejudicial to small Eastern companies.

Navy Would Move if Necessary

NAVY Department officials told THE IRON AGE this week that members of the industry had made no overtures in the direction of exemptions, although they emphasized that should steel companies show a reluctance to bid because of the new Walsh-Healey wage restrictions, the Navy would lose no time in seeking exemption from the law or otherwise attempt to eliminate any hazards standing in the way of the buying program.

But thus far the Navy Department has not been able to fully appraise the effect of the steel wage minimum wage prescribed for the steel companies receiving government contracts of \$10,000 or more. During the short period in March, 1939, when the steel wage

Washington

BY L. W. MOFFETT

Washington Editor

• Check-up shows steel companies which contested Walsh-Healey minimum wage order so far are little affected . . . Navy ready to act if manufacturers show reluctance to bid on vital materials

order was effective, the Navy Department's Bureau of Supplies and Accounts found that the steel wage stipulation "practically eliminated competition in the industry."

As described by Capt. C. W. Fisher, of the Navy's Construction Corps, the bidding on steel was "confined to two bidders agreeing to the stipulation, and as only one of these could produce steel within the whole range required, the bidding was limited on some items to one bid." After the seven small steel Eastern mills were successful in enjoining the Secretary of Labor from making effective her steel wage order, bidding immediately went back to normal.

While that same situation would undoubtedly obtain again under ordinary circumstances, Navy purchasing chiefs

point out that despite the Walsh-Healey wage stipulations, steel companies now can be expected to bid without hesitation in view of the rapidly expanding defense program rather than run the risk of losing government business to competitors.

Shortly after the defense program began to assume larger proportions, representatives of the Navy and the shipbuilding industry went before the House Naval Affairs Committee, recommending as a major step in expediting the naval shipbuilding program the relaxation of labor restrictions imposed by the law. Chairman Carl Vinson of the committee was able to secure House passage of a provision which authorized the negotiation of naval contracts without regard to the usual competitive bidding requirements.

Labor Standards Found "Threatened"

THE effect of that provision was to exempt all shipbuilding contracts from the Walsh-Healey law, including the minimum wage rates prescribed for the steel industry. One of the most vocal segments of organized labor, however, took its grievance to the White House and set up the cry that the New Deal was about to sanction the destruction of existing labor standards.

The upshot was that when the bill, identified as the Walsh-Vinson measure, reached the Senate floor, it contained a provision specifically making all contracts, whether negotiated or otherwise, subject to the provisions of the Walsh-Healey Act.

Of course, the President was given the authority to suspend the act whenever it was deemed advisable in the interest of national defense, but the fact remains that there is little or no sign that the present Administration is willing to relax the provisions of a law which was anathema to War and Navy Depart-



Automotive parts plant

MONORAIL PAY!

Chemical plant

Costs reduced 75% by handling waste directly from process to dump without transfer.

Warehouse

Heavy cases stored in 1/4th the former time. System pays for itself within three months after installation.

Textile mill

Rolls of cloth automatically transferred from floor to floor saving \$2340 each year.

Bolt factory

Cost of handling rod in coils reduced from 40¢ per ton to 8 1/2¢ per ton with monorail system.

Malleable foundry

Special monorail loop permits dumping of annealing pots in 36% of the former time.

Metal fabricator

40,000 tons of steel handled over the system in five years at a cost of 10¢ per ton.

"Tailor-made" systems from standard parts!

Every American MonoRail system meets a special need. It must be "made-to-order". But even the most elaborate installation consists in greater part of standard units fabricated with special accessories into a co-ordinated, smooth-working system.

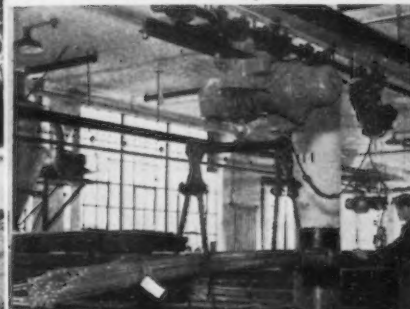
No high initial costs need pile up. A few feet of track, a trolley and hoist, often serve as the starting point. Extensions here and there, until department after department link together, unite eventually into complete overhead service.

Flexibility alone in American MonoRail standard parts makes possible such application. It permits engineers to adapt devices for weighing—dipping—loading—transferring—many entirely automatic, without excessive structural changes.

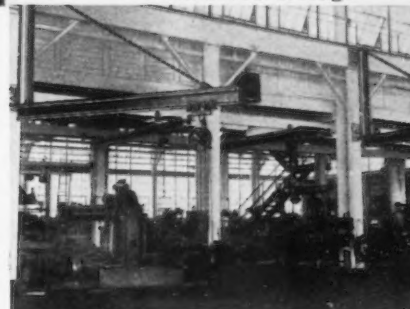
These features are fully described in a 254 page book used as a technical reference for overhead handling problems. Copy, as well as complete engineering service, is available without obligation.



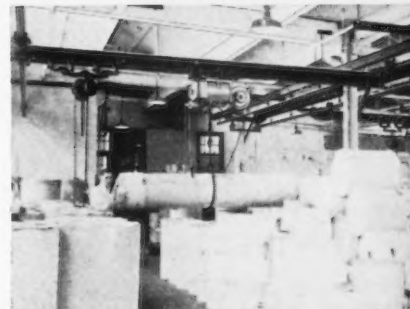
Over laundry extractors



Brass rod storage



For machine service



In paper warehouse



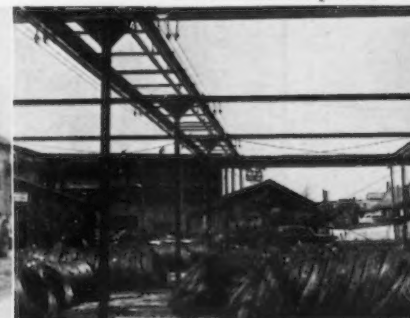
Chlorination plant



Cupola charger unit



Unloading sheet steel



Outside coil storage



AMERICAN MONORAIL

13103 Athens Ave., Cleveland, Ohio

ments even before the advent of the super-defense program.

Army and Navy officials during recent months have recommended to the White House that because of a shortage of skilled workers that statutory restrictions on weekly hours of workers in navy yards and industries engaged in defense work be waived; but Mr. Roosevelt has been adamant. The first objective is to absorb a couple million unemployed, Mr. Roosevelt contended, advising them flatly that he found it difficult to believe that any such shortage existed. He volunteered the information at a press conference last week that he was taking a firm stand against any relaxation of labor standards under the defense program at least for the present. He said he recognized that subsequent developments may make such relaxation necessary, but that by no stretch of the imagination is it necessary now.

U. S. Can Build Manganese Plants

AS finally enacted and signed by the President a national defense measure carrying supple-

mental appropriations gives the Bureau of Mines discretionary authority to erect and operate more than one pilot plant for the beneficiation of manganese ore. In its original form the measure provided for only one such plant. It was then proposed that the government erect a plant with a daily capacity of 50 tons. The act carries \$2,000,000, the same appropriation as that originally provided, so that while more than one plant may be erected, the capacity will not be increased. The original draft called for production of metallic manganese by the electrolytic process only while the law itself provides for production by the "electrolytic or other process."

Meanwhile, the American Manganese Producers Association, heretofore expressing disappointment at the government purchasing program, has announced through President J. Carson Adkerson that domestic producers will be "considerably heartened" by the Reconstruction Finance Corp's current move to assure the country adequate stockpiles of strategic materials. Mr. Adkerson said that the association, claiming to represent 90 per cent of domestic production,

believes the new purchase program will "provide the necessary impetus for the industry's return to its rightful position of prominence."

1,000,000 Tons a Month

MR. ADKERSON pointed out that in announcing the creation of the Metal Reserve Co., Federal Loan Administrator Jones was quoted as saying that, insofar as they are available, strategic materials produced domestically will be purchased by the company.

"This is indeed heartening news for domestic manganese producers," said Adkerson. "Our country will consume probably 1,000,000 tons of manganese ore during the next 12 months. Although domestic shipments are now at the rate of 40,000 tons annually, during the war-year 1918 our domestic mines shipped 305,000 tons.

"The industry now stands in need of encouragement to develop its mines, concentrate its ores to the proper grade, and generally rebuild itself to its rightful status in this country's national defense picture. That process may sound slow and laborious, but such is not the case. Concentrating and beneficiation plants could be established at central points in producing areas throughout the country, and high and low grade ores produced and blended or beneficiated to required specifications, in a comparatively brief length of time."

Sweden Produces More Iron

A REPORT by Sweden's Iron Masters Association, transmitted to the Commerce Department by the American commercial attache in Stockholm, showed this week that Sweden's steel consumption amounted to 1,000,000 tons during 1939 and that the same level is expected this year. The report said that pig iron production was at an unusually high level in 1939 and that the rolled steel and ingot output established a new record.

Whether the steel industry in Sweden can satisfy this anticipated demand in 1940 depends upon the adequacy of supplies of scrap, pig iron and fuel, the report declared.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Strike Idleness Less in Illinois

Chicago

••• Illinois employees lost 606,953 man-days because of strikes in 1939, according to an analysis by the Illinois Manufacturers' Association, based upon data received from the Department of Labor. This was 3.4 per cent of the total number of man-days idle as a result of strikes throughout the entire country.

Experience of other industrial states is as follows:

State	Workers Involved	Man-Days Idle	Per Cent of Total Man-Days Idle
Illinois ..	74,017	606,953	3.4
Penna. ..	179,320	3,403,306	17.2
Michigan. .	130,410	2,499,115	14.1
New York 135,984		1,236,547	6.9
California. .	83,679	1,038,109	5.8
Ohio	50,458	768,961	4.3

The total number of man-days idle throughout the country was 17,812,219. The industries most affected by strikes in 1939 as measured in terms of man-days idle were bituminous coal mining, 7,303,000 and automobile manufacturing, 2,535,000. There were more strikes in New York City (597) in 1939 than in any 10 other cities combined.

Harvill Aircraft Will Build Los Angeles Plant

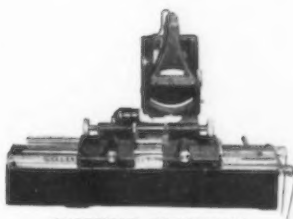
••• Construction of a 60,000-sq. ft. welded rigid frame plant and office building for the Harvill Aircraft Die Casting Corp. is to be started at once at Century and Sepulveda Boulevards, Los Angeles, under contracts just awarded to the Austin Co., engineers and builders, Cleveland.

The plant, to cost more than \$200,000, will be the first in the far west to apply the Austin "tree-form" design which maintains unobstructed head room in structures of sawtooth design. The plant will have aisles 40 ft. wide and 27 ft. to the peak of the sawteeth, without any intermediate cross members to obstruct operations or the even distribution of light.

THE All-American GAGE



SHEFFIELD ELECTRIGAGE



SHEFFIELD PRECISION
THREAD LEAD
CHECKING MACHINE



SHEFFIELD VISUAL GAGE



SHEFFIELD TAPER
CHECKING MACHINE



SHEFFIELD UNIVERSAL
INTERNAL MEASURING
MACHINE

ALL Sheffield Gages are made right here in the United States by American workmen and from American materials. Their manufacture is in no way dependent on the fortunes of foreign wars or the difficulties of high seas transportation.

And they have proven their unmatched accuracy, durability and gaging speed in American industries and laboratories.

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MASTER



GAGEMAKERS

NITRIGAGES

Fatigue Cracks

—BY A.H.DIX—

Three Thumbs Down

••• The current week's deluge of protests over the title "*Fatigue Cracks*" totals three—(1) "*It's sour*"; (2) "*Too technical*," and (3) "*The change was fatal*"—but, we hope, not necessarily serious.

An anonymous postcard reads "*Why not 'Lonely Hearths'?*" Good, but last week's "*Lowlights of Industry*" shaded it. Maybe within a few weeks more the new name, like a new set of false teeth, will have worked itself in and the pain will have subsided to a dull ache.

Lese Majesty

••• The day before our piece appeared about attending a White House press conference, Jim Ellis, our Associate Washington editor, telephoned us in agitation from the Capital to tell us he hoped we hadn't used any direct quotations, as they are verboten.

We had used one but had cut it out at the last minute as the piece was a paragraph too long. It was about a young lady reporter inquiring whether it was the Administration's intention to coddle the manganese industry and a certain person asking whether she said coddle or cuddle.

We wish now the paragraph had got in, as Jim reversed the charges on us, and we would like to have learned something for our money.

Glistening Haven

••• We are writing this on the second night in our new home at No. 1 Pershing Square, or 100 E. 42nd St., or 100 E. 41st St. The painters are still dabbing varnish on the partitions, and everything is painfully clean. There must be at least twenty miles of clear glass partitions on the floor, giving the impression of a huge, waterless aquarium.

The windows in our cubicle at the old address were cleaned only semi-annually, the maculateness providing much privacy. At the moment we feel like a deshelled turtle, but maybe we will get used to it.

Compromise

••• The Copper and Brass Mill Products Association and the Copper and Brass Research Association have been merged under the name of Copper and Brass Research Association.—*The Iron Age*.

That ought to satisfy everybody.

Sausages and Doughnuts

••• SOMEWHERE IN ENGLAND—This correspondent watched tanks being punched out like doughnuts on American-made machines in a plant so fast, so efficient, it made observers' heads swim . . . Acres of machines, many of them stamped Cincinnati, were grinding out tanks like sausages in a sausage machine.
—*New York Times*

But suppose they forget how to turn it off.

Ho Hum!

••• It used to be that we glowed every time your favorite family journal was quoted in another publication, but it happens so often now that we can yawn right in the face of a stack of clippings, including even mentions by the syndicated columnists.

Most of them give the source of their information as THE IRON AGE and let it go at that, but some feel impelled to do a little embroidery. For instance, the *New York Times* forgets its customary caution and refers to us enthusiastically as "*a magazine of the steel industry*," which is much less than a half truth. The *New York World Telegram* says, "*Everyone in the trade recognizes The Iron Age as a very conservative publication*." The "*very*" seems to us unnecessary. The most accurate description is one appearing in the discriminating *Mail Order Journal*, which refers to us simply as "*the great Iron Age*."

Pleasant Parting

••• Our subscriber, The Solarine Co., Baltimore, maker of metal cleaning compounds, ends its letters with "*Yours for a bright future*."

Let the Punishment Fit the Crime

••• Sharp-eyed E. Bryan, of The Harriston Stove Co., Ltd., Harriston, Ont., noticed that in the same issue in which we apologized for quoting British prices with the sterling sign hind end foremost—12£ 2s. 6d., the error was repeated. He says:

••• "*Instead of keeping the proofreader in after five I suggest as punishment that you give him a holiday and send him up to Canada for a two weeks' fishing vacation—to rest his eyes*."

The suggestion is generous but the example would be bad.

Puzzles

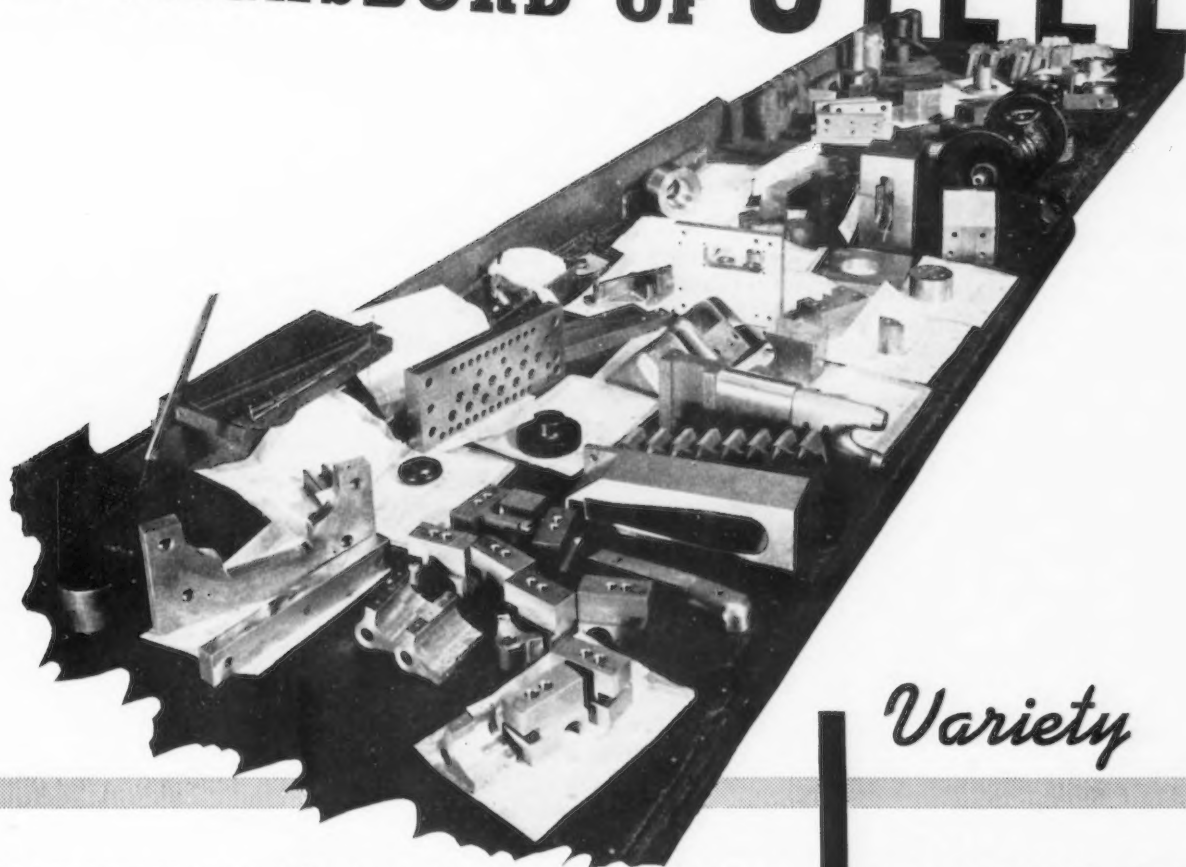
Last week's answer is 4.

After toying for three hours with Donald W. McGill's bridge problem published here on June 27 we proved to ourselves that it is impossible. It is, therefore, annoying to get word from H. M. Oshry that the lead of the club king, discarding the diamond ace, followed by a lead of the diamond 3, trumping it high, and leading the heart 7, throwing West in, gives you six out of seven.

Ten minutes will do for this:

A butcher wishes to weigh quantities of meat from 1 to 365 pounds, using as few weights as possible. He finds only six weights are necessary. What are they?

A SMÖRGÅSBORD OF STEEL



Variety

ONE OF THE busiest work benches in the heat treating world is shown above. It is in the tool hardening department of the Lindberg Steel Treating Co. Every day sees that bench loaded with thousands of dollars worth of tools and dies waiting to be hardened. With so much at stake, there can be no gambling. These tools and dies must be hardened without scale and without decarburization; and so they are Hydryzed.

Here it was that the Hydryzing Process originally went to work some 24 months ago, after countless months of laboratory work. Today Hydryzing bears the burden of the tool hardening department. Here, under the most exacting kind of service, Hydryzing goes along handling practically every type of tool steel made . . . and handling this wide range of steel with positively no adjustments to the atmosphere. *Hydrying utilizes but one atmosphere . . . and it's the same for all steels.*

This complete freedom from adjustment means that you are assured of scale-free hardening, with no trace of soft skin or decarburization when your work is treated in the Hydryzing Process. So whether you have a veritable Smorgasbord of steel to treat, or just a few of the old reliable brands, check up on Hydryzing. And the easiest and most convincing way we know of for you to check on Hydryzing, by the way, is to send some of your parts in to us to be Hydryzed. There's no charge, and they'll be returned to you immediately for inspection. LINDBERG ENGINEERING COMPANY, 228 North Laflin Street, Chicago.

HERE'S THE ACTUAL LIST OF TOOL STEELS ON THE BENCH WHEN PICTURE WAS TAKEN

LATROBE "CV"
 POLDI TEN X N
 STUBBS DRILL ROD
 VULCAN CRUCIBLE SPECIAL
 VULCAN CRUCIBLE ALIDIE
 VASCO NON-SHRINK
 PARAGON
 CARPENTER STAINLESS "A"
 KETOS
 RED STAR TUNGSTEN
 OILDIE
 COLONIAL No. 6
 SKF 48
 UB 46
 JESSOP'S YELLOW LABEL
 TRU-FORM
 POLDI STABIL
 STENTOR
 HY-TEN "M"
 PENINSULAR YELLOW LABEL
 SWED-OIL

LINDBERG FURNACES

HYDRYZING FOR HARDENING • CYCLONE FOR TEMPERING

News of Industry...

Recent Laws Give Government Power to Take Over Industry

Washington

••• There is little or no public comprehension of the enormous powers given the government under the stream of laws recently enacted in the name of national defense. Carried in these laws is power to nationalize industry.

Under them the government can take over private plants, public utilities, and transportation. It is not likely that it will do so—at least not soon—but it can if it so wills. The government can build, equip and operate plants. Except for certain types of ordnance plants, such as powder mills, it probably will not use this authority for the present further than lending funds. The government can prohibit exports. It long has operated a licensing system on tin plate scrap, arms and ammunition. Now it has a wide authority under the May-Sheppard Act to embargo or curtail exports of military equipment or munitions, machinery, tools or supplies necessary to their manufacture.

This covers about everything, except ostrich feathers, as some would-be wit has said. By Presidential proclamation a licensing system has been set up under this provision which sets up what many believe will amount to an embargo on certain machine tools, and strategic raw materials. Profits on aircraft and naval ships have been limited to 7 per cent when contracts are negotiated and to 8 per cent when awards are made by competitive bidding, with no guarantee against loss. Taxes already enacted eat increasingly into profits. They are only a mild prelude to what is to come by way of the excess profits tax that is in the offing.

So today in the hands of the President, as commander-in-chief of the Army and the Navy, are powers that give him virtually absolute control of industry and the economic life of the nation. Not a great deal more power could be

given him if the full force of the war-time National Defense act of 1916 were in operation.

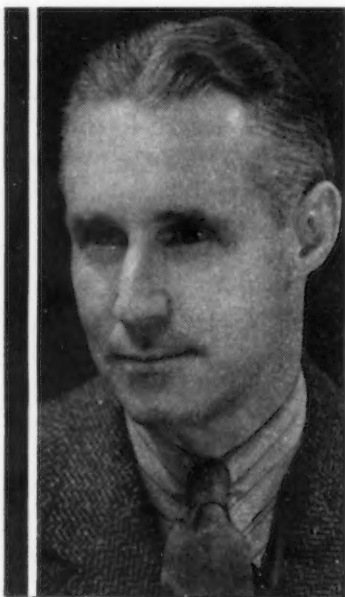
Rightfully the powers given the government have stirred no alarm so far as they have been exercised. General recognition is granted that in the face of pressing national defense requirements strong powers of government control is necessary. A republic has to be prepared temporarily to shed a great deal of its freedom in emergency. It must do so if it is to live and certainly the civilization it represents, the only civilization that is worth while to the American people, never before was threatened as it is today, by a beastly totalitarianism.

But the disturbing thing about these broad powers handed over to the government is the fear that

they will not be surrendered when the emergency has passed if the present administration is continued in power. Ironically, New Dealers, posing as liberals, are pushing the third term ballyhoo to the limit. They are setting up the ridiculous plan of the "indispensability" of Mr. Roosevelt in the present emergency, as if this was a one-man government.

As they rage about dictatorship they expound the idea of establishing that form of government for the United States. This is labeled under some soothing term, such as "planned economy." The present emergency is turned to to justify creation of a dynasty only because it is more convenient than any other device or so the New Dealers imagine. They had a large stock of other emergencies before the existing one developed to spread their third term propaganda. Their motive obviously is selfish. They love their comfortable jobs, in which they rattle, and they love the power and limelight that go with them. They are indifferent to the implications of the cause they espouse. They are unconcerned about the threat involved in violating a fundamental tradition of the republic, of creating disunity. They are blind or indifferent to the appalling failure of the New Deal, with its perpetual deficits, unprecedented debt, and its 10,000,000 unemployed. The distrust the New Deal has of business, and the distrust business has of the New Deal do not figure in New Deal calculations.

It has grasped tremendous powers in the name of emergency, created only in its own mind or by its own incompetence. Never has it yielded any powers except by court mandate. The fear is that powers given in the name of self-defense will be held firmly to set up a form of government—whatever the name—that would be repugnant to American principles, unless the New Deal goes down to defeat in November. And, outward pretenses notwithstanding, the New Dealers are jittery lest defeat is in store for them despite the power of the government purse and its billions to beguile votes.



A. H. BORDEN has become president of Borden Metal Products Co., manufacturer of gratings, safety steps, spiral stairs and special floors for industrial plants, refineries and subways. The company has acquired a plant near Elizabeth, N. J.

Steel Exports At 20-Year High

•••Iron and steel exports reached their highest level in 20 years when in May a total of 471,481 gross tons valued at \$31,217,379 was shipped from the United States to foreign buyers, according to preliminary figures released by the Metals and Minerals Division.

Twenty per cent above the April trade of 391,754 tons valued at \$29,223,257. May 1940 exports were more than three times as great as those of May 1939 (147,760 tons valued at \$11,661,926).

Five months cumulative exports—2,152,936 tons valued at \$159,176,055—fall just short of being three times as large as the trade of the January-May period of 1939 when 733,307 tons of iron and steel valued at \$56,464,410 left the United States for foreign markets.

Shipments to every continental area except the Far East rose in May as compared with April. Sharply increased shipments to the United Kingdom lifted the total of exports to Europe to the high level of 192,744 tons as compared with 137,583 tons in April. Canada accounted for the greater part of the increase in the trade with North and Central America and the West Indies—to 80,812 tons from 65,935 tons in the month preceding.

Argentina, Brazil, Chile, Peru and Venezuela all participated in the sharp gain in the trade with South America—to 102,683 tons from 77,552 tons. In the Far East, to which area shipments declined to only 69,338 tons in May from 85,502 tons in April, increases in the trade with China and the Philippine Islands did not offset the reduced trade had with the Netherlands Indies and Japan. The high level of the trade with Africa, reached in April, continued in May with purchases totaling 25,904 tons.

Reaching a total of 8,549 tons valued at \$1,026,425, imports of iron and steel registered their second successive monthly increase in May. Receipts of these products in April had totaled 6192 tons valued at \$544,608 and in May 1939 had amounted to 24,171 tons

Scrap Exports in May 40% Above April Total

•••Exports of scrap from the United States continued to rise in May when a total of 312,483 tons valued at \$5,109,424 moved to foreign buyers. This was an increase of some 40 per cent over the April trade of 221,152 tons valued at \$3,575,940, but fell far short of the 384,881-ton, \$5,638,013 trade of May 1939. Included in the May 1940 total was 310,069 tons of iron and steel scrap of which 98,652 tons went to Italy, 66,860 tons to Japan, 63,919 tons to the United Kingdom, 49,369 tons to Canada, and 11,446 tons to Switzerland.

Despite increases recorded in the April and May export trade in scrap the 1940 five-months trade in these materials—1,162,736 tons valued at \$19,867,357—is still well below the 1,390,064-ton, \$20,570,577 trade of the January-May period of 1939.

valued at \$1,405,983. Eighty-nine per cent of the May 1940 receipts was ferro-alloys.

Cumulative imports for the first five months of 1940 were only fractionally as great as those of the comparable period of 1939. In that year this trade had amounted to 132,141 tons valued at \$8,538,802, whereas in 1940 only 34,107 tons valued at \$3,969,234 entered the country.

Coming Meetings

July 22 and 23—Institute of Scrap Iron and Steel, mid-year meeting, Buffalo.

Sept. 3 to 6—American Society of Mechanical Engineers, fall meeting, Spokane, Wash.

Sept. 24 to 27—Association of Iron and Steel Engineers meeting and exhibition, Chicago.

Oct. 21 to 25—National Metal Congress, Cleveland.

Oct. 31 to Nov. 2—Society of Automotive Engineers, national aircraft production meeting and exhibition, Los Angeles.

Congress Budget Staff Proposed

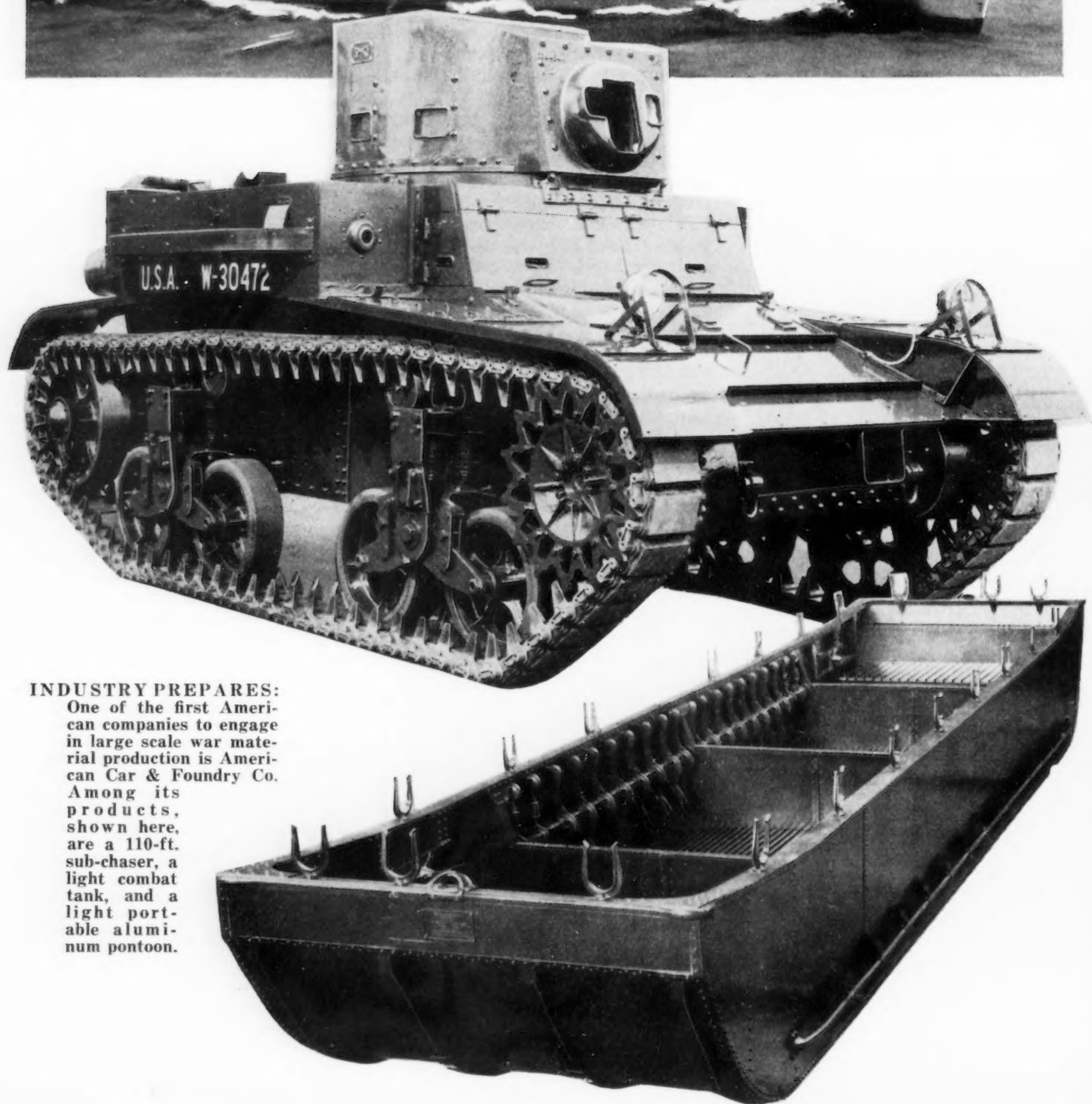
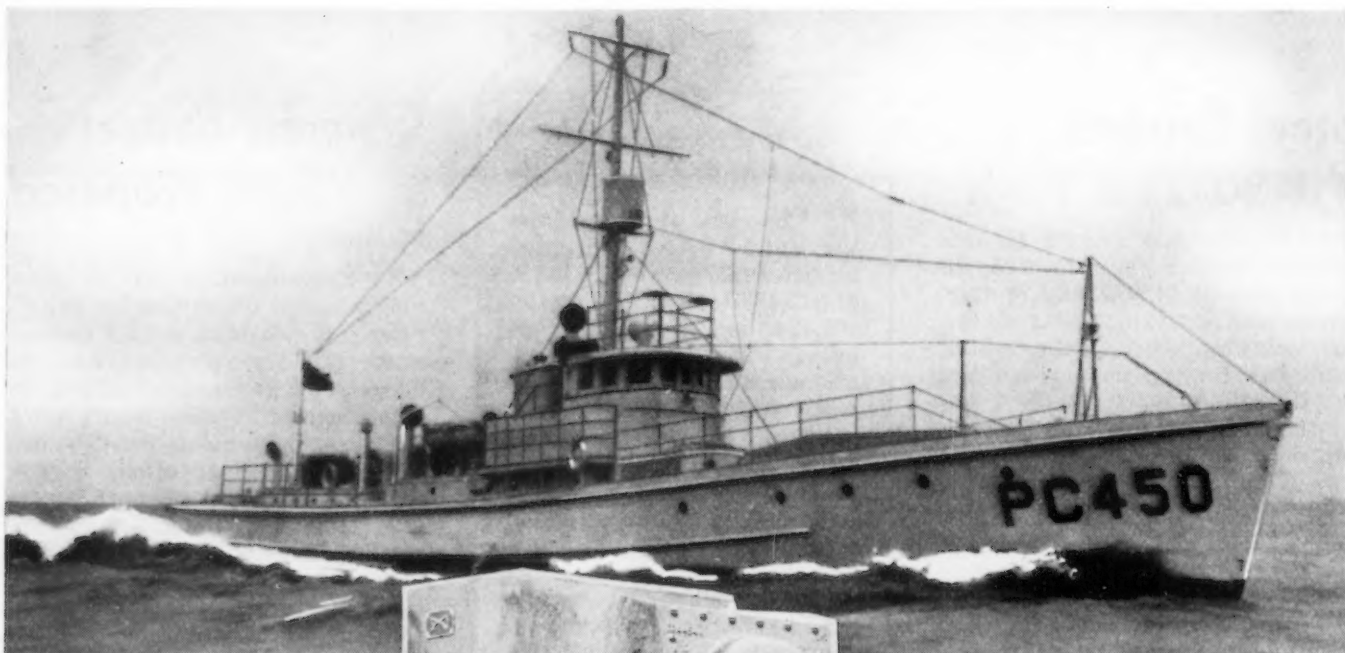
Washington

•••Establishment of a joint congressional committee on appropriations, provided with a permanent staff of specialists on budgetary and financial affairs, is recommended in the report of a study made public recently by the Brookings Institution. Such a committee, says the report, would tend to promote judicious determination of financial policy; whereas under the present system, by which fiscal measures undergo independent consideration by committees of each house, the legislative result is frequently determined by compromise. The study, which deals with the origin, development, and present status of the federal financial system, was made by Dr. Daniel T. Selko.

If a joint appropriations committee is not established, it is recommended that the clerical staffs of the House and Senate appropriations committee should be increased to enable them to study budget estimates more thoroughly.

Two specific changes are suggested: (1) to replace all political appointees in the Bureau of Customs and Internal Revenue by carefully selected, well-trained, permanent civil servants, and (2) to remove both these bureaus from the Treasury Department, placing each under a bi-partisan commission exercising all the powers of the present commissioners. Such changes are not only consistent with reorganizations recently effected, it is pointed out, but would permit more orderly administration of both fiscal and revenue functions without adding employees or increasing costs.

The report states that as legislative control of the purse depends upon effective accounting methods, the federal accounting system should (1) provide accountability for every officer in any way responsible for the receipt, custody, and disbursement of public funds, and (2) permit consolidation for presentation to the public of reliable accounting statements covering the financial condition and operations of the government as a whole.

**INDUSTRY PREPARES:**

One of the first American companies to engage in large scale war material production is American Car & Foundry Co. Among its products, shown here, are a 110-ft. sub-chaser, a light combat tank, and a light portable aluminum pontoon.

British Stop Leakages of Steel; Each Consumer Given a Symbol

London

••• The British Iron and Steel Control has taken further steps to insure the satisfactory working of the allocation plan. Tonnages of steel were allocated and each type of consumer was allotted a symbol. Consumers were given up to May 31 to supply symbol and contract numbers for the orders they had placed, but a substantial number of contracts remained unmarked at that date. To meet this situation a final extension was granted to June 15, orders not then symbolized being cancelled.

It has been established that on the whole steel is now being devoted to work of national importance, but there has been some leakage—steel being employed on picture theater and brewery construction. Applications for such purposes are not now permissible when big tonnages are being drawn from America at a high cost.



••• An outstanding feature of the British iron and steel industry recently has been the acceleration of efforts to secure supplies of scrap. Large quantities are awaiting collection in all parts of the country and all tonnages received

Steel Shortage Seen for Italy

London

••• It is believed that Italy will soon be faced with an acute shortage of iron and steel unless she can greatly increase her ore imports from Spain. The greater part of 400,000 tons of iron and steel a year is produced from Spanish and Moroccan raw materials. Of her annual imports of iron, scrap from the United States has hitherto supplied about 70 per cent, or 600,000 tons.

The Italians claim that their maximum domestic steel output is 4,000,000 tons a year, but the best recorded effort in any year so far has been about 2,000,000 tons.

at consuming centers are being rapidly absorbed.

In the pig iron industry steps have been taken to substantially increase output in order to make good the loss of production in Belgium and parts of France now held by the enemy. With attention almost entirely devoted to the production of iron for steelmaking, foundry iron is less readily obtainable.

Defense Spending Spurs Building Construction

••• Defense spending lifted June industrial building construction to near-record levels, the month's volume, \$51,130,000, as reported by *Engineering News-Record*, being exceeded only once in the past 10 years, in June, 1937, when new steel mill construction in Pennsylvania swelled the volume to \$87,565,000.

Tennessee Powder Co.'s \$15,000,000 powder plant was the largest single industrial project for the month directly attributable to war spending, but other industries no less important to defense also swung into action. Notable among the large June awards were: oil refining, aluminum reduction, plywood and glass factories, public utility plants, and machine shops.

Industrial building awards averaged \$12,783,000 per week for June, gaining 108 per cent over the average for the corresponding month last year, and topping the May, 1940, average by 63 per cent.

The June total brought industrial building to \$222,400,000 for the first half of 1940, a figure exceeded only once in the 11 years since 1929. The 1940 six-month total more than doubled the volume for the first half of last year, and is two and one-half times greater than in 1938.

CONTRACTS AWARDED FOR 2 MORE CRUISERS, 3 PLANE CARRIERS

Washington

••• Approximately 19,000 net tons of plain steel will be required for the three aircraft carriers and two cruisers which were awarded July 3 to the Newport News Shipbuilding & Drydock Co., Newport News, Va. The cruisers also will call for about 2000 tons of armor plate. The contracts, made on a negotiated basis, amount to \$169,530,000, the aircraft carriers being awarded at \$43,662,000 each and the cruisers at \$19,272,500 each. With the award of the five contracts, Acting Secretary of the Navy Compton said that construction had been started on all com-

batant vessels of the Navy authorized and appropriated for at that time.

The total number of ships on which construction was started during a three-week period was 92. The types of vessels included in this group are: Two battleships, four aircraft carriers; 15 cruisers; 38 destroyers; 28 submarines; one submarine tender; one seaplane tender (large); 2 seaplane tenders (small); and one minesweeper. The most energetic shipbuilding program ever undertaken by this country in such a short interval of time, it amounts to 499,435 displacement tons and a construction

cost of \$1,140,000. Plain steel requirements are estimated at 110,000 net tons. This is about 0.2 per cent of the annual finished capacity.

The expeditious manner of awarding these contracts was attributed to the cooperation of William S. Knudsen, member of the National Defense Committee, and preliminary negotiations by the former Secretary of the Navy Edison with shipbuilding companies, as well as timely calculations of cost and plans for the construction of ships in government navy yards.

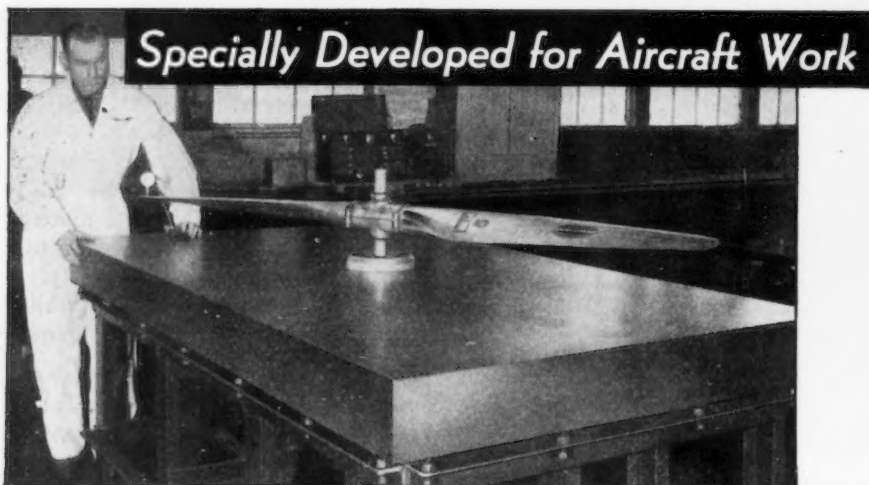
First Quarter Orders Increase 40% for G-E

••• Orders received by General Electric Co. during the three months ended June 30 amounted to \$115,163,267, compared with \$82,188,693 in the same period last year, an increase of 40 per cent, Charles E. Wilson, president, announced. For the first six months this year, orders received amounted to \$212,653,314.

Henry Ford Trade School Graduates 170 Students

Detroit

••• Henry Ford Trade School has graduated 170 students in the 1940 class, with the graduates scheduled now to spend a year in the Ford plants to round out their training in skilled trades. W. J. Cameron gave the commencement address.



CHALLENGE Semi-Steel LAYOUT SURFACE PLATE

● This smooth, accurate surface is essential equipment for inspecting, assembling, or checking plane and motor parts, instruments, small assembly units, special streamlining devices, etc. Also used for many light machining operations.

Made of the finest iron and steel, planed perfectly smooth and square, the Challenge Semi-Steel Layout Surface Plate is accurate, rigid, and

durable. It is available with or without the strong, reinforced, arc-welded, all-steel frame which is provided with 32 lock leveling screws for quick, dependable adjustment.

Challenge Surface Plates are made in one standard size: 48x96 inches; special sizes on order. T-slot grooving, scoring, and machining for special purposes are available.

CHALLENGE Semi-Steel LAPPING PLATE



● Made of finest semi-steel, specially heat-treated and carefully machined, in sizes ranging from 8x8 to 54x144 inches... Write today for specific details on Challenge equipment for the aircraft industries; also general machinery catalog.

● Joints required to hold oil can be properly lapped with ease and precision by using a Challenge Lapping Plate. It is specifically designed to assure a perfect fit when lapping in metal to metal joints on which no gaskets, shellac, or sealer of any kind is used. This plate has $\frac{1}{16}$ -inch grooves, spaced $\frac{1}{2}$ -inch apart, running the full length and width of the dependably accurate surface. Sold with or without arc-welded, all-steel stand.

THE CHALLENGE MACHINERY COMPANY

GRAND HAVEN, MICHIGAN

CHICAGO,
17-19 E. Hubbard Street



380

NEW YORK,
50 Church Street



PHILIP M. MCKENNA, above, of McKenna Metals Co., Latrobe, Pa., and Arthur H. Alexander, Victoria, B. C., of George H. Alexander Machinery Co., have organized Kennametal of Canada Ltd., for manufacturing

Navy Awards Contracts For Graving Docks

••• The Navy Department has awarded a contract for the construction of one graving dock each at the Norfolk, Va., and the Philadelphia Navy Yards. The award was made on a cost-plus fixed-fee basis and went to Spencer, White & Prentis, New York; Foley Brothers, Pleasantville, N. Y., and the Merritt, Chapman & Scott Corp., New York, as a joint venture. The estimated cost is \$16,175,000.

Acme Steel Plant Closed for Vacation

Chicago

••• The Riverdale, Ill., plant of the Acme Steel Co. has shut down for two weeks for the annual vacation period. The general offices here are open as usual.



Kennametal, the new steel cutting carbide, for Canada and the British dominions. Mr. Alexander has been in the U. S. several months buying equipment for a new plant at Hamilton, Ont.

Chrysler Engineer Publishes Book on Superfinishing

••• Arthur M. Swigert, Jr., director of production research, Chrysler Division, Chrysler Corp., tells "The Story of Superfinishing" in a book of 672 pages just issued by the Lynn Publishing Co., Detroit. The book is illustrated throughout with photographs, charts and microphotographs. The subject (first discussed at length in a series of articles in THE IRON AGE in 1938) is dealt with in detail.

The reasons for surface finish are analyzed, nomenclature is established and all the available instruments for measurement of surface finish are described. Next the various means of obtaining surface finish by metal cutting tools and abrasives are examined, including an analysis of ship formation and the manufacture and use of grinding wheels.

Koppers Will Rebuild Bethlehem Coke Ovens

Pittsburgh

••• The Koppers Co., engineering and construction division, has received a contract from the Bethlehem Steel Co. for the rebuilding of a battery of old type Koppers coke ovens into a battery of 51 modern Koppers-Becker ovens at Bethlehem's Northampton plant, Bethlehem, Pa.

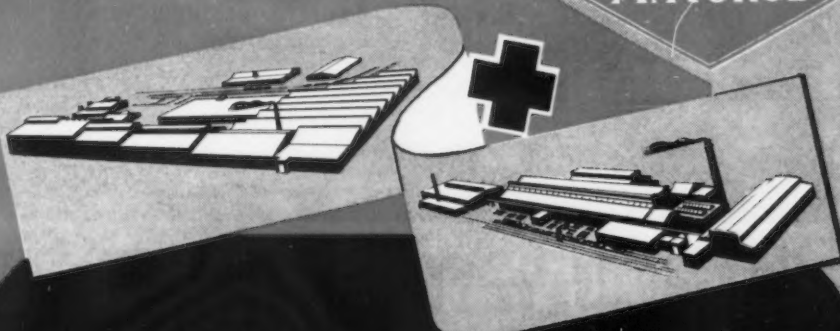
Part of Pay Cut Restored By Tin Plate Company

Pittsburgh

••• A compromise settlement of the union's demand for full restoration of a wage reduction has been made by the Standard Tin Plate Co., Canonsburg, Pa., and the Amalgamated Association of Iron, Steel and Tin Workers, whereby the company restores more than half of the 8 2/3 per cent cut.

NOW YOU CAN GET BOTH
YOUR UPSET AND
DROP FORGING
REQUIREMENTS FROM

AMFORGE



YOU need look no farther now for your Forging needs.

With the addition of the Great Lakes Forge Company's modern drop forge plant to its complete upsetting facilities, AMFORGE becomes your logical source of supply for Forgings.

This expansion of facilities will enable you to procure the forgings you need from a central shipping point, reductions in freight costs may now be gained

by ordering mixed carload shipments of both Drop and Upset Forgings.

Avail yourself of AMFORGE extensive equipment and experience to give you quality Forgings, in any desired volume . . . and very possibly, substantial savings in steel, freight and machining. Send us sample parts or dimensioned prints and we will submit quotation on quantities specified.

AMERICAN FORGE DIVISION
OF THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY
2621 SOUTH HOYNE AVE., CHICAGO, ILLINOIS

Export License Action Affects Tools, Metals

Washington

••• Covering practically all machine tools, together with a comprehensive list of strategic metals and other essential items, the government applied an export licensing system on July 5 as a national defense measure. Hereafter shipment of the affected products abroad, subjected to military direction, can be entirely prohibited or curtailed. This rigid supervision of exports was established by President Roosevelt in a proclamation based on a provision of the May-Sheppard law. As Commander-in-Chief of the Army and Navy, the President appointed as Administrator of Export Control Lieut. Col. Russell L. Maxwell. Indicative of the authority given

Colonel Maxwell is the fact that on export control he supersedes even the Secretary of State who will be instructed on what products may be exported. The army officer is subject to the orders of the President only.

Colonel Maxwell is administering the licensing system through the State Department's Division of Control in collaboration with the Materials Production Division of the National Defense Advisory Commission. Since 1937 the division's licensing system applied to arms, ammunition and implements of war and previously it was applied to tin plate scrap. Under the May-Sheppard Act this system is greatly broadened.

While President Roosevelt, in commenting on his May-Sheppard proclamation, pointed out the difference between an embargo and the licensing system, he said that there was no doubt that the products listed in the proclamation would henceforth remain in the United States or that if licenses

Exporters Complain of Short Notice Given

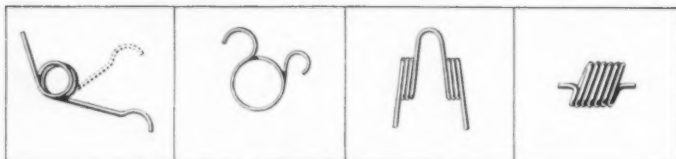
Washington

••• Complaints have been made by exporters that the government had not given sufficient advance notice of the effective date of the new export licensing system. The result, they stated, is that shipments had moved to and been piled up at docks in New York and other ports and held there because the exporters had no licenses. Heavy losses are alleged to have been suffered.

Colonel Maxwell told THE IRON AGE that he thinks there has been undue alarm on the part of exporters. He pointed out that the State Department is prepared to clear licenses quickly with as little interference as possible. He added also that it will take a little time to get the system to working smoothly through the customs offices, but that everything will be done to avoid as far as possible inconvenience to exporters.

the practical side of Springmaking—BY DUNBAR

Some tips on TORSION SPRINGS



- * They should be free on rod or post—when under full load.
- * The action should tend to reduce or wind the coils.
- * Sharp bends should be eliminated.
- * Material should be selected for individual conditions of temperature, corrosion or stress.
- * Ends should be designed for easy assembly.



WE RECOMMEND

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were granted it was the belief that shipments would be permitted only to Latin-American countries.

Working closely with Colonel Maxwell regarding licenses for exports of machine tools is H. B. Vance, in charge of the National Defense Advisory Commission machine tool section. In private life Mr. Vance is chairman of the board of the Studebaker Corp., South Bend, Ind.

Under the Presidential proclamation the licensing system brings under export control metal working machinery for (1) melting or casting; (2) pressing into forms; (3) cutting or grinding, power driven; and (4) welding machines. This includes virtually all machine tools, exports of which have mounted sharply since 1938 due to war demands while at the same time the industry is faced with an enormous domestic national defense program. The original army-navy \$200,000,000 program is expected to be increased greatly by growing national defense appropriations and authorizations. Though already operating at top

speed the industry, it is said, will be called upon to further expand production, a situation that is complicated by a shortage of skilled mechanics. Export control in view of this condition long had been expected.

Reflecting the sharp rise in American exports of machine tools is the fact that total exports in the first five months of 1940, aggregating \$73,400,410, were little more than a \$1,000,000 short of similar exports in the entire year 1938, amounting to \$74,670,338, and only \$20,000,000 less than in 1939, a year of heavy foreign shipments. The chief consuming countries have been England, France, Russia and Japan.

The category of melting or casting machines includes such foundry equipment as molding machines, and blast cleaning and tumbling machines, exports of which, when compared with foreign shipments of machine tools, have been small. In 1939 exports of molding machines amounted to \$218,000, of which England took \$116,800 and Canada, \$46,700. Exports of cleaning and tumbling machines totaled only \$25,500 of which Canada took \$18,600. Outgoing shipments of "other foundry equipment" amounted to \$978,900, Canada taking \$474,500; British India, \$191,850 and the United Kingdom, \$132,200.

In the classification "pressing into form" are included rolling mill machinery, sheet and plate metal working machinery and forging machinery. Exports in 1939 of rolling mill machinery amounted to \$10,000,000, of which the United Kingdom took \$3,990,000 and Japan, \$3,034,000.

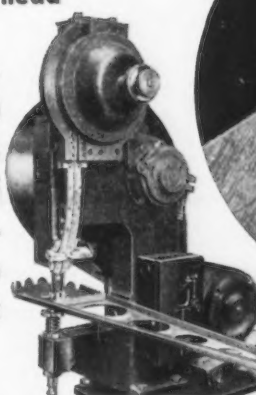
Exports of sheet and plate metal working machines last year totaled \$5,351,000. The chief countries of consumption were United Kingdom, \$1,777,000; Russia, \$1,432,000; Canada, \$536,000; France, \$405,000 and Japan, \$345,000. Exports of forging machinery in 1939 were valued at \$4,750,000, distributed by chief countries as follows: Japan, \$1,638,000; France, \$912,000; Russia, \$786,000 and the United Kingdom, \$705,000. Outgoing shipments of "other" power-driven machinery aggregated \$11,471,000. The principal consuming countries were the United Kingdom, \$4,996,000; Japan, \$1,495,000; France, \$1,131,000; Russia, \$1,046,000 and Canada, \$923,000.

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Maxwell Puts Export Licensing in Effect

Washington

• • • Lieut. Col. Russell L. Maxwell, General Staff Corps, United States Army, designated by the President as Administrator of Export Control to administer the provisions of the May-Sheppard National Defense Act, put a licensing system in effect on July 5. It covers practically all machine tools and a formidable list of raw strategic metals. The system is operated through the Division of Export Control, State Department, but Colonel Maxwell maintains an office in Room 2068, Munitions Building, Washington, D. C.

Colonel Maxwell was born in Oakdale, Ill., Dec. 28, 1890, and graduated from the United States Military Academy on June 12, 1912, at which time he was commissioned a second lieutenant of field artillery. He was transferred to the Ordnance Department, Nov. 15, 1915. He served as commanding officer, Picatinny arsenal, New Jersey, from October 1918 to January 1919, Chief Explosive Section, Ordnance Department, Office, Chief of Ordnance, January to May 1919. He was with the American forces in Germany as commanding officer of the Hallaschlag ammunition plant and Mulheim ammunition depot in Germany from July, 1919 to July, 1921.

Colonel Maxwell was on detail in the War Department General



COL. RUSSELL L. MAXWELL, above, has been appointed Administrator of Export Control by President Roosevelt. He will be responsible for shipments of munitions, materials and machinery to foreign countries.

Staff from July 1, 1928, to June 1, 1930. He graduated from the Army War College, 1934; The Command and General Staff School, 1924, and the Army Industrial College, 1925.

U. S. Army Base Gets Scrap Handling Cranes

Boston

• • • Facilities for handling scrap metal at the Boston army base, will be materially improved before the close of July. A gantry electro-magnet crane may start operations before July 20, and a second similar crane a week later. The cranes cost \$90,000 each and are rated the heaviest and most efficient in the country. Each will be capable of handling 50 tons of scrap metal an hour on a 24-hr. a day basis. With these two there will be four magnet cranes in operation at the base.

3-Floor Building Planned By Republic Subsidiary

• • • A new 3-story building, 160 x 164 ft., totaling more than 75,000 sq. ft., will be added to the plant of the Berger Mfg. Division of Republic Steel Corp. at Canton, Ohio. The first floor will be used by the welding department and assembly machines. Included also will be a centralized paint-mixing department from which paint will be piped to points of use throughout the plant. The second floor will house the executive, engineering and production offices, and the third, the sales and accounting departments.

British Steel Plants Operate on 7-Day Week

London

••• Iron and steel producers throughout the United Kingdom continue to receive orders for far more business than they can execute and as a result, although outputs are maintained at record levels, only essential work is being carried through. Still higher records are to be expected in the near future now that the 7-day week and overtime is general throughout the industry. In these circumstances the maintenance of the supply of ore, scrap and other raw materials has become still more vital.

While some inconvenience as to ore will naturally follow the extension of war to the Mediterranean, yet Spain and West Africa remain easily accessible, and any deficiency can undoubtedly be made good by the United States and Empire countries. Additional blast furnaces are now being blown in.

Ductility to be Known As N-A-X High Tensile

Pittsburgh

National Steel Corp. has announced that the special low alloy steel made by Great Lakes Steel Corp., known as Ductiloy, will henceforth be marketed under the trade name of N-A-X High Tensile. The step is being taken "to identify more closely the name of this superior alloy steel with the corporate name of the parent company—National Steel Corp." Under the new trade name, there will be no change in the chemical or physical properties of the product.

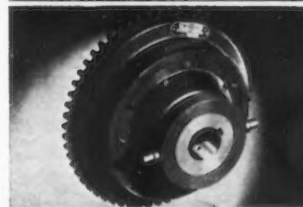
Republic Machinery Corp. Is Organized at Toledo

Toledo

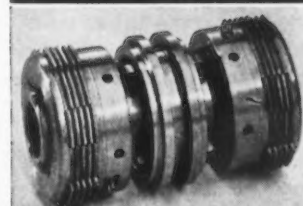
••• The Republic Machinery Corp. has been formed here to take over the machine tool division of the National Supply Co. The new company will be headed by H. E. Oatis, president and treasurer, who has been serving for some time as branch manager of the Toledo store of the National Supply Co. Offices are at 416 Richardson Building.



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National Defense Program Points To Possible End of AFL-CIO Break

Washington

• • • If the national defense program is to become the medium for ending the five-year conflict between the AFL and the CIO, as rumored in a number of speculative stories in circulation, the White House has shown no sign that it expects such a development to materialize. In fact, Mr. Roosevelt has indicated that the administration has not found the rift in the ranks of organized labor to be a deterrent to the defense program.

Nevertheless the role of organized labor in the preparedness drive is a subject which merits increased attention particularly in view of the growth of labor organizations nurtured by the New Deal. Among the developments which point to the possibility of greater labor harmony if not outright ending of hostilities are:

1. Appointment of a Labor Policy Advisory Committee by Sidney Hillman, labor coordinator of the National Defense Advisory Commission, which pledged itself to a united labor movement for the furtherance of the defense program.

2. Membership of the labor committee, which included 16 officials representing three distinct sectors of the labor movement, was regarded in some quarters as virtually free from the inclusion of rival unions. Similarly, the almost complete absence of representatives of CIO unions recognized as being dominated by Communists was considered significant.

3. Appointment of Daniel W. Tracy, president of the AFL's International Brotherhood of Electrical Workers, as Second Assistant Secretary of Labor, whose designation by Secretary of Labor Perkins was interpreted as a move to offset the selection of Mr. Hillman, CIO official, as labor coordinator on the defense commission. Mr. Tracy, who succeeds Marshall E. Domock at the Labor Department, has long been a bitter opponent of NLRB policies which were flavored strongly with CIO bias.

One off-key note, however, was

sounded by Chairman J. Warren Madden of the National Labor Relations Board, who said in a radio address on July 5, the fifth anniversary of the signing of the Wagner Act, that only through strict compliance with the act can industrial democracy be operative and labor troubles held to a minimum. Mr. Madden's appeal, which represents another attempt by Administration officials to regain the spotlight after having been pushed to the background since the advent of the defense commission, was characterized in some quarters as slightly incongruous with labor's defense activities in view of the Wagner Act's reputation in the ranks of industry and some sections of organized labor.

Mr. Madden reviewed the experiences in industrial relations at the beginning of war preparations in 1917, contending that the need for a supervised system of



PUBLIC INTEREST in the story of steel manufacturing is shown by attendance at U. S. Steel Corp.'s showing of "Men Make Steel" at the New York World's Fair. This picture several times has played to capacity audiences from 10 in the morning to 10 at night.

collective bargaining was abundantly demonstrated at that time. It was his observation that the industrial democracy which was started in 1917 as a necessary part of the preparedness program "lapsed after the World War and was not restored until the National Labor Relations Act of five years ago." The NLRB chairman resounded a frequent labor board chant that the "trend of strikes has been sharply downward since workmen have been allowed to organize."

The labor policy advisory committee designated by Mr. Hillman has recommended among other

Use of Open Top Cars Limited for Defense

••• To conserve transportation capacity to meet demands which may develop in connection with national defense preparations, the car service division of the Association of American Railroads has announced that the use of open top cars would be restricted to "the purpose for which they are designed, that is, the movement of freight."

According to this order, effective July 15, no coal cars will be placed for loading at coal mines where more than one day's supply already was being held under load and unconsigned. Such cars are commonly referred to in the trade as "no-bill" coal loads. The railroad association said there are now being held at mines more than 41,000 unconsigned cars loaded with coal.

things that an inventory of experience and skills of unemployed union members be undertaken immediately to help in making available such skilled workers as may be required by private industry in meeting defense requirements. Included among its members are:

H. W. Brown, president of the AFL's International Association of Machinists; Clinton Golden, regional director, Northeastern region, Steel Workers Organizing Committee, Pittsburgh; Charles J. MacGowan, vice-president, International Brotherhood of Boiler-makers, Iron Shipbuilders, Welders and Helpers of America, Chicago; R. J. Thomas, president, United Automobile Workers of America, Detroit; and D. W. Tracy of the AFL's electrical workers union.

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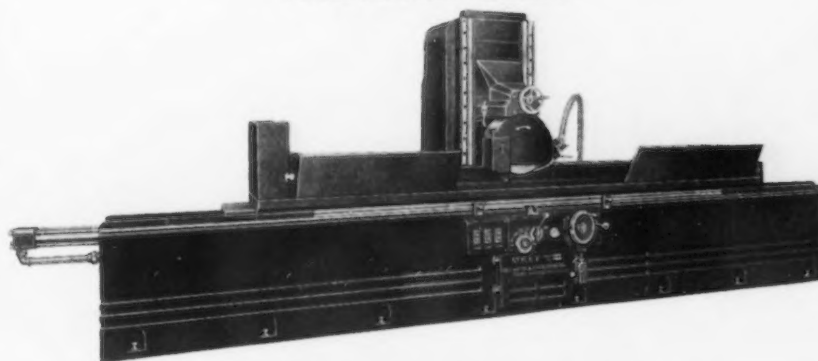
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U. S. Court Orders Labor Board to Hold Election in Chicago Plant

Chicago

• • • In an unprecedented opinion, the United States Circuit Court of Appeals here last week ordered the National Labor Relations Board to hold an election at the plant of the Stewart Die Casting Co., Chicago, to determine if a majority of the employees want the United Automobile Workers of America local union, a CIO affiliate, to be their collective bargaining agent.

The board had directed the company to recognize the CIO unit as the bargaining agent following a strike at the plant in 1937. The

court held that the board's presumption of a continuance of a majority membership among plant employees in favor of the CIO union has extended an unreasonable length of time. Furthermore, the court said, "certainly there is no presumption that it continues forever and we think that it does not continue for as long as three years, especially in case of an assertion and offer of proof to the contrary."

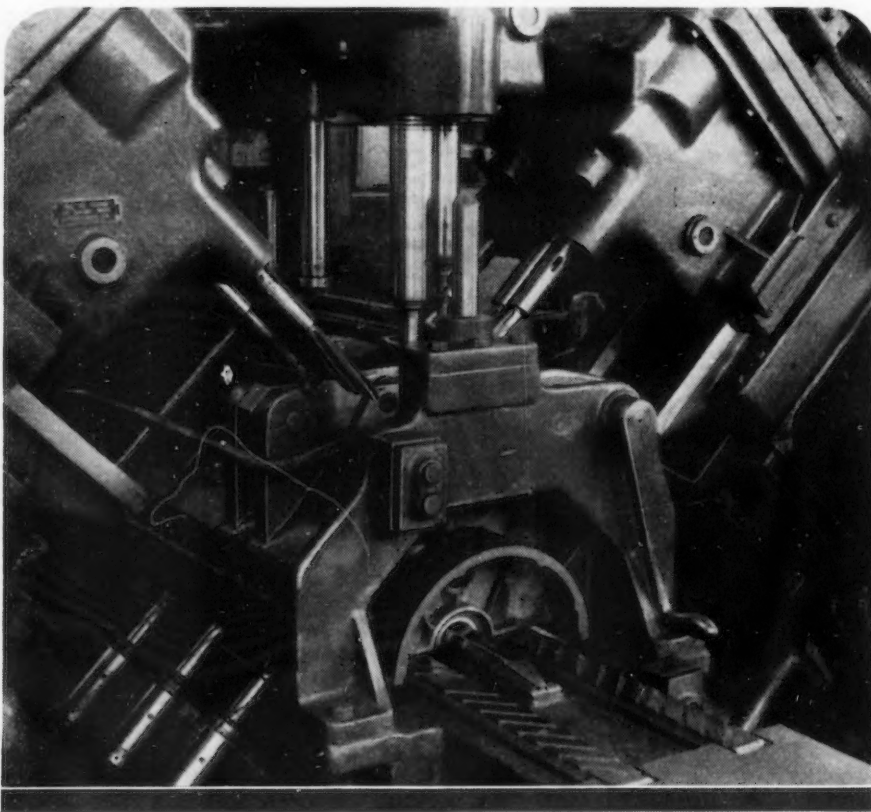
The court affirmed an order of the board that the Stewart company should reinstate with back pay, 190 workers who participated

in a sit-down strike at the plant in March, 1937. These workers were discharged after the strike and have been unemployed since. The board's ruling that Stewart must repay the cost of relief and WPA work that these men received while unemployed, was reversed by the court which held that this amount may be subtracted and withheld by the company from the total back pay owed.

It was indicated unofficially by a labor board spokesman here that the court's order to the board to conduct a new election at the Stewart plant may be taken to the Supreme Court.

Machine Tool Men Added To Defense Commission

• • • Expected to handle details in connection with rulings on machine tool priorities are two men added to the staff of the National Defense Advisory Commission on July 8. They are Don M. Laffin, who has been representing the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., in the New York area in recent years, and A. B. Einig of Motch & Merryweather Co., machine tool dealer organization in Cleveland. Both men will be assistants to Harold S. Vance in charge of the machine tool section and formerly chairman of the Studebaker Corp. Mr. Vance is on the staff of William S. Knudsen, who is in charge of the production phases of the defense program.



WORTHLESS FOR SOME PURPOSES: Much of the machine tool equipment used in the automotive industry is special purpose in character and is not suitable for conversion to the manufacture of a radically new design. In a cylinder block production line, for example, many machines are literally built around the block, with sliding heads coming in at all angles to drill, bore, ream or tap specified holes at specified angles. This photo, taken at the Ford plant, shows a battery of core drills at work on the intake and exhaust cores in the small V-8 cylinder block. Such a machine would be worthless for producing a 2000-hp. liquid cooled engine of V-bank type because of wide variations in dimensions and angles.

Harvester to Lift Small Tractor Production 60%

Chicago

• • • Within the past two weeks, orders have been placed by International Harvester Co. for a sufficient number of machine tools to increase by 60 per cent production on the company's two small tractors, the Farmall A and B, at the tractor works here. The new equipment will be added to feeder lines only, the existing assembly lines being capable of handling the greater volume of parts that will result. No new building will be necessary. Production of the crawler type tractors will not be affected by this action.

Iron Shortage Halts Canada's Steel Rate Rise

Toronto

••• Canada's ever increasing efforts for greater production of war materials of every description are receiving the fullest support of industrial leaders. Especially is this a fact regarding the iron and steel industry, where output is at a record high.

A handicap to even greater steel production in Canada has been a shortage of pig iron in some plants, a problem recently exaggerated due to necessity of blowing out furnaces for repairs and relining. During May pig iron production in Canada totaled 93,254 long tons with steel ingot output at 168,703 tons, a new high record. However, since the beginning of May one furnace was blown out for relining and it is reported that the company concerned has placed a large contract with a United States firm to supply pig iron and deliveries already are proceeding on this order. While company's officials have made no announcement in this direction, it is understood that the pig iron imports, chiefly basic iron, will total about 9000 tons per month.

While there has been no actual shortage of iron and steel scrap in Canada, imports from the United States have been running at record levels, with deliveries in May reported close to 50,000 tons, although the advance in prices is said to have resulted in curtailment of imports. Approximately two-thirds of the steel produced in Canada is from scrap. Imports of iron ore, also are running at a record high level.

The Citadel Merchandising Company, Ltd., has been organized to insure the supply of machine tools and other equipment essential to war industry. The company, although fully owned by the government, is operated as a non-profit, private organization with offices in Montreal and with representatives in Ottawa and New York. Citadel Merchandising now



STEEL MIRRORS for use in washrooms of industrial plants (as shown in this photograph) are being made by Sheet Metal Specialty Co., subsidiary of Follansbee Steel Corp., Pittsburgh. Kromirror is the trade name of the new mirror.

is in full operation coordinating the production and procurement of machine tools in Canada to war needs under supervision of C. D. Howe, munitions minister, and the following directors: president, Thomas Arnold, chairman of Manitoba Steel Foundries, Ltd., and director of Algoma Steel Corp., Ltd.; vice-president, L. J. Belnap, president of Consolidated Paper Co., Ltd.; directors, J. D. Johnson, president of Canada Cement Co., Ltd.; C. E. Gravel, director of Bell Telephone Co. of Canada, Ltd.; F. K. Morrow, director of Massey-Harris Co., Ltd.

Officials of Dominion Steel & Coal Corp., Ltd., Sydney, N. S., report that operations are well above normal capacity, new records having been made during recent weeks in output of iron, steel and coal. In addition to the two-year British contract for ingots, it is reported that an expanded British market for iron ore from the company's mines at Wabana, Newfoundland, has developed since the collapse of France and the alienation of Spanish and Swedish supplies. Stocks at Wabana as of May 1, totaled 850,000 tons when the management decided to cut production to half-time. However, the company now has returned to full production.

War contracts had a stimulating effect on production and earnings of Algoma Steel Corp., Sault Ste. Marie, Ont., for the fiscal year

ended April 30, 1940. For the year sales totaled \$16,264,821, an increase of 52 per cent over sales of \$10,344,255 in the year immediately preceding.

To meet increasing government demands for motor vehicles and other military equipment, Ford Motor Co. of Canada, Ltd., Windsor, Ont., has started work on a \$700,000 addition to its plant, with Canadian Bridge Co., handling the steel contract. The new plant will be used for manufacture of universal machine gun carriers for the Canadian government, production expected to run 50 a week when the plant is fully run in. Over 50 per cent of the Canadian Ford plant is now being used for making military machines of various sorts. Much of this production is being exported to other countries in the Empire.

For instance, the company is now working on an order for 36,000 military vehicles; of this order 10,000 will go to the Canadian government, 25,000 to South Africa, Australia and India. Military vehicles being made by Ford include: Light two-wheel drive trucks, known as 8 cwt.; 15 cwt. units used as anti-tank gun tractors and other heavier loads; 30 cwt. four-wheel drive; three-ton units, and four-wheel drive gun tractors used to haul artillery, ambulances, these in addition to regular passenger cars and station wagons for military use.

Munitions Studied By Westinghouse

Pittsburgh

• • • Westinghouse Electric & Mfg. Co. has offered the government an outline of its facilities for producing war equipment and materials, and has suggested that all large American companies do likewise.

"I wish to point out," said A. W. Robertson, Westinghouse chairman, "the extreme importance of getting started at once. Manufacture of new products cannot be commenced until necessary facilities have been obtained, engineering development and production studies completed, and men trained. In some kinds of production this takes many months."

Projects which Westinghouse can start as soon as facilities are provided include:

Manufacture of shells in large quantities, time required to get into production—6 to 24 months, depending on quantity.

Production of fuse timers for shells—12 to 15 months.

Manufacture of gun mounts and other gun accessories—4 to 24 months, depending on type and quantity.

Manufacture of special and standard lighting equipment, including the newly developed radio-controlled seadrome contact lights—some production at once.

Generators and motors for aircraft auxiliary power—8 to 12 months.

Radio equipment for military use on land, at sea and in the air—6 to 8 months.

These projects are either over and above the regular manufacturing work in which the company is now engaged, or involve large increases in production. Military and naval projects now in work in Westinghouse plants include propulsion and other equipment for naval vessels, radio apparatus for aircraft and miscellaneous projects.

Steps already taken by Westinghouse in anticipation of the defense program include formation of an Emergency Products Division, a central tool design and

Steel Drills Stolen At Various Plants

Cleveland

• • • Three thousand steel drills necessary to industries engaged in the government's preparedness program were stolen over the July 4 holiday from the National Twist Drill & Tool Co., here. Company officials said a large number of similar thefts have been reported in the East. Seven tons of tin ingots were stolen from the American Works of American Steel & Wire Co. June 30 after the watchman had been tied up. Police arrested a former employee and three alleged confederates and recovered all of the tin several days later.

manufacturing organization, a training school for skilled workmen and a survey of required new buildings and facilities.

The Westinghouse company, no stranger to production of materials for war, in the World War produced 1,200,000 rifles, at the rate of 5000 a day, at East Springfield, Mass., 1,000,000 of these for the British and Russian governments, and 200,000 for the U. S. It also produced 53,000 heavy Browning machine guns for the U. S. Army, the first gun being delivered in three months, the first 30,000 in 10 months. The company also produced 8,500,000 rifle grenades, 529,000 grenade dischargers, 2,041,000 6-in. shells, 1,160,000 8-in. shells and 95,000 4-in. shells.

Dominion Places 1366 War Orders in Week

Ottawa

• • • New war orders continue to be placed at a rapid rate. During the past week the Department of Munitions and Supply awarded 1366 contracts with a value of \$6,214,891. Following are the more important awards in the new list:

Machinery, tools, etc.—Canada

Iron Foundries, Ltd., Montreal, \$130,039; George W. Crothers, Ltd., Toronto, \$9,500.

Electrical equipment—Canadian National Telegraph Co., Montreal, \$21,660; Canadian Pacific Railway Co., Montreal, \$12,320.

Aircraft supplies — Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, Que., \$14,468; Aluminum Co. of Canada, Ltd., Montreal, \$14,597; Aviation Electric, Ltd., Montreal, \$112,750; British Aeroplane Engines, Ltd., Montreal, \$16,417; Canadian Vickers, Ltd., Montreal, \$1,932,984; Noordduyn Aviation, Ltd., Montreal, \$40,665; Irvin Air Chute, Ltd., Ottawa, \$86,712; Metallic Roofing Co. of Canada, Ltd., Ottawa, \$6,568; Robert Mulhall, Ottawa, \$21,447; Ontario Hughes Owens, Ltd., Ottawa, \$152,787; Stanley Mfg. Co., Ltd., Toronto, \$119,106; Lockheed Aircraft Corp., Burbank, Cal., U. S. A., \$5,578.

Ordnance—Air Ministry, England, \$495,054; Canadian Cycle & Motor Co., Weston, Ont., \$21,652.

Briggs Mfg. Co. Will Build Airplane Parts

Detroit

• • • Briggs Mfg. Co. here is preparing to enter the aviation parts business as a sub-contractor to major airplane manufacturers in the East and far West, it has been learned on good authority. The firm has already set up a staff of aeronautical production experts and has made tentative moves which, it is understood, indicate initial orders for well over a million dollars worth of sheet metal airplane parts. Unofficially, it is learned that Briggs has determined to put many times this amount of money into tooling up and establishing itself in the aircraft parts business, a field which it has heretofore not touched.

Briggs has been for years a leading builder of automobile bodies, with Ford Motor Co. and Chrysler Corp. divisions as principal customers until Ford established its own body plant a little more than a year ago. In recent years it has gone into the plumbingware business, manufacturing a line of stamped steel bathtubs and kitchen ware. Briggs also has a division manufacturing auto moldings.

Packard Engine Plans Hit Snag

Details in the Assembly Line, page 56, regarding the Packard-Rolls-Royce transaction, were obtained and written prior to the Packard directors' meeting Monday. Later developments are carried in the following story.

••• Indication was given here Monday that some sort of unexpected hitch had interrupted, at least temporarily, the negotiations for an airplane engine contract between the United States government and the Packard Motor Car Co. A terse statement, authorized by the Packard board of directors after a hurried special meeting and released to the press by M. M. Gilman, president, merely said:

"The matter of a possible contract for the building of Rolls-Royce motors for England and the United States was discussed at a meeting of all of the board of directors of the Packard Motor Car Co. today. The Packard Motor Car Co. is anxious to be of public service and is hopeful that a satisfactory agreement can be reached, but there are many matters that require further study."

When his attention was called by newspapermen to the fact that the firm's statement was open to individual interpretation and was ambiguous, Mr. Gilman said, "That's all that I can say; I've got my orders and a job to do, the same as you." He refused to amplify the statement or to answer questions about what matters "require further study." Asked whether the directors were in accord about accepting British orders, as well as United States orders, Mr. Gilman said: "I can't answer 'yes' or 'no' to that." He also refused to state whether possible profit restrictions by the government were discussed. He said, however, that he would go to Washington again in regard to the Rolls-Royce deal, but would not indicate whether the next move in negotiations is up to the government or to the auto company.

Mr. Gilman emphasized that Ford Motor Co. has given utmost cooperation to Packard since the latter became the prominent pros-

pect for the contract. Ford has turned over all data on the engine "that we need," Gilman said.

The Packard president estimated that "whoever" takes on the engine building job will need about 1,200,000 sq. ft. of factory floor space, and added that Packard has practically that much to spare, thus correcting an earlier impression that a great deal of building would be required if Packard gets the contract. He also stated that the initial production rate planned by Packard was 20 per month, after 10 months' tooling, and that the rate 15 months after signing of a contract would be 850 a month.

Throughout the interview with the press, Mr. Gilman emphasized that plans were contingent on reaching contractual agreement with the government.

The feat of preparing Packard to carry out such a contract, when and if it is signed, appears to observers to promise to be an interesting one. The increase in personnel, from 10,000 regular employees to 24,000, is an increase of 140 per cent, it is pointed out.

NLRB Issues "Proposed Order" Against Armco

Washington

In a "proposed order," announced on Monday, the National Labor Relations Board directed the American Rolling Mill Co. to withdraw all recognition from and completely disestablish the Zanesville Armco Plan of Representation as a collective bargaining agency for any of its employees. The board charged that the "plan" was devised and calculated to afford the employees nothing but the semblance of collective bargaining.

Census Prepared for Use of Defense Commission

Washington

The Bureau of the Census, in compiling figures on its 1940 census of manufacturers, has selected a preferred group of 37 industries directly related to national defense on which it is speeding up its tabulation for the use of the National Defense Advisory Commission.

THIS BOMB SHELTER, said to be the first built in the U. S., consists of quarter-inch plates reinforced by bolted sectional angles. It weighs approximately 1400 lb., rests on a concrete base, will accommodate four or five persons, is 6 ft. sq. at the bottom and 8 ft. high, costs \$100, and is designed, according to Harold Brooks, head of Brooks-Skinner Co., the maker, to protect from flying fragments, not from direct hits. The Brooks-Skinner plant at Quincy, Mass., plans production of 50,000 shelters yearly, Mr. Brooks told THE IRON AGE.



Navy Rehabilitating Ordnance Plant

The program of rehabilitation of the U. S. Naval Ordnance plant at South Charleston, W. Va., is being started. This plant was built during the last war but the greater part of it has stood idle since until the recent reconditioning work was started. Contract for steam boilers and accessories has been let to the Dravo Corp., Pittsburgh, for the installation of Lee unit heaters in the machine shop of this plant. Originally the plant was served by a number of small coal-fired boilers, but these have since been removed and Dravo is installing two 90,000 lb. per hr., 250 lb. pressure Riley boilers to be fired with natural gas. The steam provided will be used for the operation of large presses.

Over a year ago (*THE IRON AGE*, May 4, 1939, issue, page 68) the Navy Department leased a small part of this plant consisting of a few heating furnaces to Carnegie-Illinois Steel Corp. to accelerate deliveries of light weight heat

treated plates. These plates were rolled at the company's Homestead works, shipped to South Charleston for heat treatment, and returned to Homestead for finishing.

3000 at Warner & Swasey 60th Anniversary Luncheon

Cleveland

••• With more than 3000 persons attending, the 60th anniversary of the Warner & Swasey Co. was marked July 6 with a luncheon and presentation of gold watches to 10 employees with 25-year service records. The affair also marked the completion of the company's new plant addition at East 55th Street and Carnegie Avenue. Charles J. Stilwell, president, reviewed problems facing the machine tool industry and unveiled a plaque bearing the names of employees with service records of 10 or more years. The veteran employees who received gold watches included Raymond J. Blyth, personnel director, and William H. Depenbrok, assistant to the superintendent.

How U. S. Ploughshares Will Become Swords

••• Here are typical conversions of products in U. S. plants from peacetime to defense manufacture. Makers of printing presses, for example, are scheduled to manufacture howitzer parts.

PEACE PRODUCT

Rolled steel products
Steel products
Fabricated basic steel products
Commercial steel castings
Rail and wire products
Motor cars
Agricultural implements

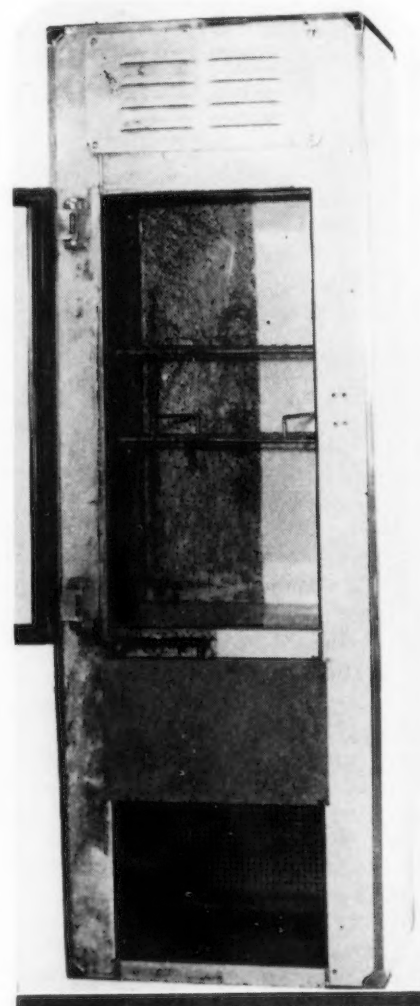
Automobile bodies
Electric refrigerators
Adding machines
Automobile steering gears
Printing presses

Automobile engines and motor cars
Fabricated piping and air conditioning equipment
Electric welded pipe
Pipe fittings and valves
Automobiles
Electrical equipment
Automobiles
Pullman cars
Railroad cars
Pumps and wood-working machinery
Drop forgings
Business machines and appliances
Railroad locomotives
Oil well and drillers' supplies
Motor cooling equipment
Springs and metal stampings
Cans and food containers
Mining machinery

WAR PRODUCT

3 in. anti-aircraft gun forgings
Forgings, 75 mm. high explosive shell
Armor-piercing projectiles
Tripods for anti-aircraft guns
Artillery shell
Light combat tanks
Combat wagons and gun carriages, artillery shell
Airplane parts
Airplane parts
Automatic pistols
Machine guns
Gun-howitzer parts. Recoil mechanisms for 155 mm. howitzer
Airplane-type combat tank engines

Bomb bodies
Demolition bombs and torpedo parts
Hand grenades
Cartridge cases, 75 mm.
Cartridge cases, 105 mm. howitzer
Artillery projectiles—shell
Forgings for 105 mm. howitzer
Artillery shell forgings
Machining artillery shell
Machining artillery shell
Artillery shell
Machining 155 mm. shell
Machining 155 mm. shell
Airplane landing wheels
Gas mask parts
Gas mask canisters
Light combat tanks.



113 DAYS' SUBMERSION in the submarine *Squalus* in salt water on the ocean's floor left the porcelain enamel on this refrigerator without permanent injury or stain, according to the Porcelain Enamel Institute. Half of each panel was washed with soap and water before photographing. The finish was applied by the Toledo Porcelain Enamel Products Co. to a cabinet made by the Herrick Refrigerator & Cold Storage Co., Waterloo, Iowa.

Britain Dominant Factor In Machine Tool Exports

Cincinnati

Great Britain is now the dominant influence in the district machine tool market, so far as foreign orders are concerned. Except for some special machines that were made for France and were awaiting shipment at the time of the cessation of the hostilities, all other orders have been transferred to England and her colonies. In addition to that, there is a continuing heavy demand from the United Kingdom, with Canada being most prominent during the past week.

Unfilled Orders For Steel Gains

Washington

Rising 41.2 points, iron and steel orders in May, 1940, stood at the index of 145.1, compared with April's 103.9, based on 100 for January, 1939, and showed an increase of 7.4 per cent in unfilled orders, according to the monthly industry survey of the Bureau of Foreign and Domestic Commerce. The general average gain in all durable goods was 3.4 per cent. New orders for electric machinery rose to 141.2 from 130.5 and reflected an increase of 1.2 per cent in unfilled orders. New orders for "other machinery" rose to 141.7 from 132.9 and unfilled orders increased 1.4 per cent. Other durable goods registered 133.1, compared with 123.4 and reflected an increase of 3 per cent in unfilled orders.

Iron and steel inventories made a slight gain to 113.5 from 110.8; electrical machinery advanced to 116.5 from 114.5; other machinery dropped .4 of a point to 110 from 110.4; other durable goods declined to 107.8 from 108.6; transportation equipment increased to 168.1 from 159.6 and automobiles and equipment dropped to 98.2 from 108.5.

Iron and steel shipments increased to 133.1 from 120.8; electrical machinery to 147.5 from 142; "other machinery" to 154 from 150.7; other durable goods to 136.3 from 128. Transportation equipment and automobiles and equipment showed declines, the former group dropping to 219.6 from 230.9 and automobiles and equipment decreasing to 117.6 from 127.4.

Products Included in U. S. Export Licensing System

Machine tools as follows: Metal working machinery for (1) melting or casting; (2) pressing into forms; (3) cutting or grinding, power driven (4) welding. Armor plate, other than that listed in Presidential proclamation of May 1, 1937. Aircraft parts, equipment and accessories other than those listed in Presidential proclamation of May 1, 1937. Aluminum—Metallic aluminum and alloys, crude, semifabricated and scrap,

containing in excess of 10 per cent aluminum. Antimony—Antimony ores, concentrates, metal, alloys in crude and semifabricated form, and antimony compounds.

Chromium—Chromite, metallic chromium, chromium bearing alloys containing in excess of 10 per cent chromium, chromite refractories, and chromium compounds. Manganese—Manganese ores or concentrates containing 45 per cent or more of metallic manganese, and alloys containing in excess of 10 per cent metallic manganese. Magnesium—Metallic magnesium and alloys, crude, semifabricated, and scrap, containing in excess of 10 per cent magnesium. Molybdenum—Molybdenum ores, concentrates,

metal, alloys containing in excess of 10 per cent molybdenum and molybdenum compounds. Tin—Tin in metal, alloys containing in excess of 5 per cent tin in crude and semifabricated form; tin plate scrap and other scrap materials plated with metal containing tin; and other tin or tin alloy scrap and wastes.

Toluol—Toluol and light oil resulting from the distillation of coal tar. Tungsten—Tungsten ores and concentrates, metal, alloys containing in excess of 5 per cent tungsten and tungsten compounds. Vanadium—Vanadium ores and concentrates; alloys containing in excess of 10 per cent vanadium, and vanadium compounds.

FIRST HALF STEEL OUTPUT 37% OVER YEAR AGO

Ingot output in June of 5,532,910 net tons of open-hearth and Bessemer steel ingots brought the total for the first half of 1940 to 28,678,124 tons, according to the monthly report of the American Iron and Steel Institute.

The six-month total was 37 per cent greater than the total of 20,958,723 tons produced in the corresponding period of 1939.

Steel output in June was 14 per cent above the May total of 4,841,403 tons, and was 57 per cent above the tonnage in June, 1939, when 3,523,880 tons was produced.

During June the steel industry operated at an average of 84.97 per cent of capacity, as against 72 per cent in May and 53.71 per cent in June of last year. Over the first six months of 1940 steel operations averaged 72.64 per cent of capacity, compared with 52.98 per cent for the similar period in 1939.

Ingot production averaged 1,289,723 net tons a week in June, which compares with average weekly output in May of 1,092,867 tons. In June, 1939, ingot production averaged 821,417 tons a week.

1939	Reported Production (Net Tons)		Calculated Production* All Companies		Number of Weeks	*Per Cent of Capacity
	Open-Hearth	Bessemer	Monthly	Weekly		
January	3,344,830	165,193	3,578,863	807,870	4.43	52.83
February	3,085,746	219,728	3,368,915	842,229	4.00	55.07
March	3,547,915	218,057	3,839,127	866,620	4.43	56.67
1st Quarter	9,978,491	602,978	10,786,905	838,795	12.86	54.85
April	3,059,225	230,464	3,352,774	781,532	4.29	51.11
May	3,041,853	190,575	3,295,164	743,829	4.43	48.64
June	3,246,378	209,975	3,523,880	821,417	4.29	53.71
2nd Quarter	9,347,456	631,014	10,171,818	781,846	13.01	51.13
1st 6 Months	19,325,947	1,233,992	20,958,723	810,155	25.87	52.98
July	3,241,186	256,906	3,564,827	806,522	4.42	52.74
August	3,885,787	276,586	4,241,994	957,561	4.43	62.62
September	4,347,352	332,783	4,769,468	1,114,362	4.28	72.87
3rd Quarter	11,474,325	866,275	12,576,289	957,829	13.13	62.63
9 Months	30,800,272	2,100,267	33,535,012	859,872	39.00	56.23
October	5,512,718	453,600	6,080,177	1,372,500	4.43	89.75
November	5,589,235	453,103	6,147,783	1,433,050	4.29	93.71
December	5,358,320	353,250	5,822,014	1,317,198	4.42	86.13
4th Quarter	16,460,273	1,259,953	18,049,974	1,373,666	13.14	89.83
Total	47,260,545	3,360,220	51,584,986	989,355	52.14	64.70
1940						
January	5,262,760	285,714	5,655,315	1,276,595	4.43	84.11
February	4,113,446	205,527	4,409,035	1,064,984	4.14	70.16
March	3,990,510	191,559	4,264,755	962,699	4.43	63.42
1st Quarter	13,369,285	682,800	14,329,105	1,102,239	13.00	72.62
April	3,721,264	176,335	3,974,706	926,505	4.29	61.04
May	4,489,665	258,709	4,841,403	1,092,867	4.43	72.00
June	5,122,390	304,381	5,532,910	1,289,723	4.29	84.97
2nd Quarter	13,333,319	739,425	14,349,019	1,102,922	13.01	72.66
1st 6 Months	26,702,604	1,422,225	28,678,124	1,102,581	26.01	72.64

*Revised.

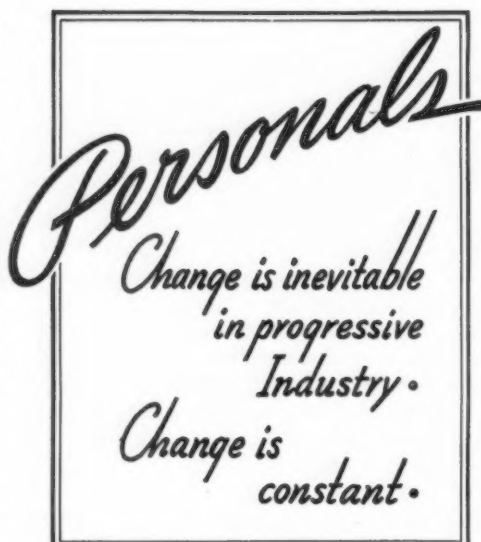
William H. McLean, who is a director of McKeesport and who has been associated with Mr. Doriot for some time, has been appointed assistant to the president. **Charles H. Hatch** has been elected vice-president in charge of finance and treasurer of the company. Until his election as assistant to the president of the National Can Corp.

• **T. R. Lippard** has been elected president and general manager, as well as director of the Federal Motor Truck Co. He succeeds **R. W. Ruddon**, resigned. Mr. Lippard joined the Federal organization last fall as vice-president in charge of sales and engineering. He has been identified with the motor truck industry for more than 28 years, and for a number of years was president of the Stewart Motor Corp. of Buffalo.

• **Harvey S. Johnson**, for the past several years on special assignment work with a firm of management engineers, has been appointed vice-president and general manager of the Metal Specialty Co., Cincinnati. After several years' experience in various departments of the metal stamping plant of the Bossert Corp., he spent four years as district sales manager in the Cleveland and Detroit territories. He later became assistant and then general sales manager of the company. Mr. Johnson received his engineering degree from Cornell University.



HARVEY S. JOHNSON, vice-president and general manager of the Metal Specialty Co.



• **Lewis M. Clement**, formerly chief engineer for the Radio Corp. of America, of which he was vice-president in charge of research and engineering, has been appointed manager of the engineering division of the Crosley Corp., Cincinnati. He has held important executive positions with a number of companies in the elec-



LEWIS M. CLEMENT, manager of the engineering division of the Crosley Corp.

trical industries, including Westinghouse Electric & Mfg. Co. and Western Electric Co.

• **J. E. Stanton**, who for the past 28 years has been associated with Republic Steel Corp. and predecessor companies in various executive capacities, has been appointed

assistant to the president of Aviation Mfg. Corp., with headquarters at the Lycoming division, Williamsport, Pa. He will coordinate the activities of industrial engineering and accounting with operations of the company's four divisions. He first became identified with the steel industry at the age of 18, when he joined the Otis Steel Co. as a junior clerk.

• **John Haien**, director of youth training at Chrysler Corp., has been appointed by the National Youth Administration to direct the training of 100,000 young men for industry in the national defense program, it has been announced by **Herman L. Weckler**, vice-president of Chrysler. Mr. Haien will spend part of his time in Washington but will retain his position with Chrysler, in addition to undertaking the duties of director



JOHN HAIEN, director of mechanical and manual training for the National Youth Administration in the national defense program.

of mechanical and manual training for the NYA.

• **George F. Doriot**, chairman of the executive committee and director of McKeesport Tin Plate Co., McKeesport, Pa., has been elected president to succeed **J. P. Fife**, who has resigned as president but who will continue in his capacity as chairman of the board.

• **F. F. Hickey**, formerly vice-president of Savage Arms Corp., Utica, N. Y., has been elected



FRANK K. McDANEL, (above) whose appointment as vice-president in charge of manufacturing operations for American Bridge Co. was announced in these columns last week. **GEORGE M. HUNTER**, (below) who relinquished that post with American Bridge after 51 years of service.



president, succeeding **W. L. Wright**, who has become chairman. **E. A. McDonald**, formerly secretary and treasurer, has been elected vice-president and treasurer, and **G. T. Wood**, secretary. **G. Noble Davidson**, formerly works manager, has been appointed general manager. **F. R. Phillips** continues as vice-president.

• **J. L. Morrissey**, formerly sales manager of the screw products division of National Acme Co.,

Cleveland, has joined the Ferry Cap & Set Screw Co., Cleveland, as vice-president in charge of industrial sales. He will devote his efforts to the sale of special parts. Mr. Morrissey was with National Acme more than 30 years and is widely known in his industry.

• **G. B. Flanigan**, since 1937 Chicago district sales manager for the Chain Belt Co., Milwaukee, has been made New York district manager, to succeed the late **W. H. Quinn**. Mr. Flanigan became associated with the company in 1925 after his graduation from Sheffield Scientific School of Yale University in 1925. For several years he was located at Milwaukee in both the manufacturing and sales departments and in 1928 became a member of the New York district sales force.

• **George H. Freers** has been added to the engineering staff of the Marmon-Herrington Co., Indianapolis. After graduating from Rose Polytechnic Institute, he served in the engineering departments of such companies as Packard Motor Car Co., Alden Sampson Truck Co., and Stutz Motor Car Co. He is a past-chairman of the Indiana section of the Society of Automotive Engineers.

• **Frank Parker**, president of Iron & Steel Products, Inc., Chicago, has been appointed to the railroad scrap committee of the Institute of Scrap Iron and Steel.

• **H. M. Lane**, whose experience in design of foundries and the installation of equipment dates back some 40 years, has been added to the staff of the Paul Maehler Co., Chicago, as foundry research engineer.

• **Joseph E. Bayne** has been named general sales manager of the Plymouth division of the Chrysler Corp. succeeding **L. D. Cosart**, who has taken up new duties with the Dodge division of Chrysler.

• **Courtlandt S. Gross**, since 1933 sales executive in charge of the New York offices of the Lockheed Aircraft Corp., has been made president of the Vega Airplane Co., Burbank, Cal., Lockheed subsidiary. **Mac Short**, for the past several years president of Vega, will become vice-president in charge of engineering. The change was made to enable Mr. Short to devote all his time to engineering



HAROLD P. INGRAM (above) new general superintendent of the Canton roll and machine works of Carnegie-Illinois Steel Corp., who, as announced last week, succeeds **WILLIAM A. HARRIS**, (below) who has retired.



problems brought on by the Government's requirements for military aircraft.

• **Stanley M. Tracy**, heretofore secretary and treasurer of the Driver-Harris Co., Harrison, N. J., has been elected executive vice-president and treasurer of the company. **John Drennan** has been made vice-president in charge of foreign subsidiaries.

• **Tom H. Jones**, who has been associated with the Ohio Leather Co., Girard, Ohio, in connection

with the company's new steam generating unit, has joined Bradshaw & Co., Pittsburgh, sales engineer for boiler plant equipment. He was formerly combustion and sales engineer for the Johnston & Jennings Co., Cleveland.

- **W. B. Wilkins** has been made sales manager of the American Manganese Bronze Co., Philadelphia.

- **R. T. Steindorf**, who has been associated with the Chain Belt Co., Milwaukee, since his graduation from Purdue University in 1924, has been appointed district manager of the Chicago office.

- **Clarence W. Avery**, president and chairman of the board of Murray Corp. of America, has been chosen president of the Detroit Board of Commerce. Among the vice-presidents are **Charles T. Bush**, president of the Charles A. Strelinger Co. and **Philip J. Savage**, vice-president of Detroit Edison Co. **Lacey S. Brown**, treasurer and assistant secretary of Great Lakes Steel Corp.; **Harry Lynn Pierson, Jr.**, president-treasurer, Detroit Harvester Co.; **Hugh J. Ferry**, secretary-treasurer, Packard Motor Car Co.; **Harvey C. Fruehauf**, president, Fruehauf Trailer Co.; **William S. Knudsen**; **A. M. Wibel**, director of purchases, Ford Motor Car Co.; **Fred Matthaei**, president American Metal Products Co., are included on the board of directors.

- **George W. Mason**, president Nash-Kelvinator Corp., has been elected treasurer of the Automobile Manufacturers Association, succeeding Frederick J. Haynes, who died recently.

- **C. H. Roberts** has been appointed purchasing agent of the South Chester Tube Co., Chester, Pa. Mr. Roberts joined the company in 1910 and has advanced through various departments in plant and general office. Since 1928 he has been general sales manager. Certain responsibilities which he has also held with respect to production and control of raw materials and finished stock are now being consolidated and enlarged under his direction.

- **John Shillinglaw** has been appointed purchasing agent of Allegheny Ludlum Steel Corp.'s plant at Watervliet, N. Y. Mr. Shillinglaw has been with the company for about 20 years, during which time

he was auditor of Ludlum Steel Co. and since the merger, has been in the accounting department of Allegheny Ludlum.

- **Stanley K. Smith** has been made first vice-president of the H. B. Smith Co., Westfield, Mass., in place of **A. Lionel Lawrence**. Mr. Lawrence has been made treasurer, replacing **Edwin W. Smith**, who has relinquished his company position.

- **S. M. Washabaugh** has been appointed sales representative for the National Screw & Mfg. Co., Cleveland. Mr. Washabaugh's territory will be in Pennsylvania and the northern part of Maryland, with headquarters in Williamsport, Pa., where he formerly was connected with Sweet's Steel Co.

- **Dr. C. B. F. Young** has been appointed adjunct professor of chemical engineering on the associated teaching staff of Brooklyn Polytechnic Institute.

- **L. G. Barnes**, heretofore identified with the Chicago district sales office of the Universal Gear Corp., Indianapolis, has been made manager of the Chicago office, at 600 South Michigan Avenue. He will have supervision of all sales offices in Illinois and Iowa.

- **S. Sloan Colt** has been elected a director of General Electric Co., Schenectady, N. Y., succeeding **Seward Prosser**, who has resigned.

- **H. W. Paret, Jr.**, has been appointed sales representative in parts of Pennsylvania, Ohio and West Virginia for the Audubon Wire Cloth Corp., Philadelphia. He will make his headquarters in the Bessemer Building, Pittsburgh.

- **John W. Alden**, formerly a metallurgist for Central Alloy Steel Corp. and Republic Steel Corp., has joined the Steel & Tube division of Timken Roller Bearing Co., Canton, Ohio. He is a graduate of Oberlin Academy and Columbia University.

- **William M. Jensen** has resigned as district sales manager, Pittsburgh Steel Co., Pittsburgh. He has been with the company for the past 13 years, having spent 10 years at San Francisco, two years at Chicago, and the past year at Pittsburgh. Mr. Jensen is returning to San Francisco, where he will go into business as manufacturers agent representing several allied steel lines.

Obituary

- **George A. Hetzler**, president and treasurer of Hetzler Foundries, Inc., Rochester, N. Y., died at his home in that city on June 22, aged 81 years.

- **Charles C. Warne**, purchasing agent of the New York Central Railroad, died July 6 at St. John's Hospital, Yonkers, N. Y., at the age of 58. Mr. Warne had been employed by the New York Central for 35 years. He was born in England, but came to the United States as a child with his parents. After graduation from the University of Pittsburgh, Mr. Warne entered the employ of the railroad.

- **Homer M. Silver**, president of Quaker City Foundry, Salem, Ohio, died July 3 following a two-month illness. He was 78 years old.

- **Richard G. Wagner**, structural engineer and bridge builder of Milwaukee, died June 28 at his home in Miami Beach, Fla., at the age of 78. He was born in Milwaukee, the son of the late Julius G. Wagner, who founded the J. G. Wagner Architectural Iron Works, later to become the first Milwaukee Bridge & Iron Works and then the American Bridge Co. After graduating from Rensselaer as a civil engineer, he became vice-president of his father's firm.

- **Frank S. Rost**, aged 77 years, vice-president of the Frankfurth Hardware Co., Milwaukee, and associated with the firm for 52 years, died June 29 in a Milwaukee hospital after several months of illness.

- **Thomas J. Meehan**, 63, vice-president and general manager of the Meehan Boiler & Construction Co., Lowellville, Ohio, died June 27 after a long illness. He was widely known in the plate fabricating industry.

- **Raymond F. Walter**, chief engineer of the U. S. Bureau of Reclamation, died at Fresno, Cal., on June 30, aged 67 years. He had held that post for the past 15 years, directing construction on Boulder, Grand Coulee and Central Valley projects.

June Pig Iron at 83.9% of Capacity

PRODUCTION of coke pig iron in June totaled 3,818,897 net tons, compared with 3,513,683 net tons in May. On a daily basis the gain in June production was 12.3 per cent over that in May, or from 113,345 tons to 127,297 tons in June. The operating rate for the industry was 83.9 per cent in June, against 74.8 per cent the previous month and 51.7 per cent in June last year.

Production for the first six months this year was 21,083,600 net tons, against 14,025,053 tons in the comparable period last year. The daily rate averaged 115,844 net tons, a gain of 49.5 per cent

Daily Output Rises 12.3 Per Cent, With 182 Stacks in Blast July 1

over the 77,486 tons in the same period last year.

There were 182 furnaces in blast on July 1, operating at the rate of 173,790 net tons a day, compared with 172 on June 1, making 119,905 net tons daily. The United States Steel Corp. blew in three furnaces and took one off blast, independent producers blew in eight furnaces and took one out of operation, and

one merchant furnace was blown in.

Among the furnaces blown in were: one Edgar Thomson, one Ohio, and one South Chicago (old), Carnegie-Illinois Steel Corp.; one Harriet, Wickwire-spencer Steel Co.; one Lackawanna, Bethlehem Steel Co.; one Haselton, one River and one Betty, Republic Steel Corp.; one Grace and one Iroquois, Youngstown Sheet & Tube Co., one Calumet, Wisconsin Steel Co., and one Zenith, Interlake Iron Corp.

The two furnaces blown out or banked were a Ford Motor Co. furnace and one Mingo, Carnegie-Illinois Steel Corp.

Production by Districts and Coke Furnaces in Blast

FURNACES	(All Figures in Net Tons)			July 1, 1940		June 1, 1940	
	June, 1940	May, 1940	June, 1939	Number in Blast	Operating Rate, Net Tons a Day	Number in Blast	Operating Rate, Net Tons a Day
New York:							
Buffalo	244,133	195,963	159,495	11	9,375	9	6,830
Other New York and Mass.			12,264			0	
Pennsylvania:							
Lehigh Valley	86,956	87,428	53,012	5	2,900	5	2,820
Spiegeleisen	4,932	4,738	4,677	1	165	1	155
Schuylkill Valley ..	44,465	44,768	20,478	3	1,480	3	1,445
Suequehanna and Lebanon Valleys ..	37,732	40,291	16,229	2	1,260	2	1,300
Ferromanganese ...	3,131	3,100		1	105	1	100
Pittsburgh District ..	834,087	734,106	454,741	37	28,440	36	26,835
Ferro. and Spiegel ..	11,372	11,452	6,049	2	380	2	370
Shenango Valley ...	61,317	29,151		3	2,045	3	1,795
Western Penna. ...	114,798	108,922	59,089	6	38,265	6	3,515
Ferro. and Spiegel ..	14,676	15,834	7,187	1	4,890	1	510
Maryland	195,975	198,197	169,852	6	6,535	6	6,395
Wheeling District ...	158,428	172,051	120,288	6	4,840	7	5,550
Ohio:							
Mahoning Valley ..	392,159	361,646	253,999	18	14,040	15	12,015
Central and Northern	293,510	256,882	190,384	14	13,930	12	8,150
Southern	64,194	60,719	51,658	5	2,140	5	1,960
Illinois and Indiana ..	778,937	670,001	442,887	30	27,050	27	24,450
Michigan and Minnesota	125,306	124,707	83,888	6	3,855	6	4,025
Colorado, Missouri and Utah	53,650	64,060	42,297	3	1,790	4	2,065
Ferromanganese ...	3,577			1	120	0	
The South:							
Virginia						0	
Ferromanganese ...	3,031	3,200	3,135	1	100	1	105
Kentucky	26,710	23,414	16,500	2	890	2	835
Alabama	254,985	274,776	197,047	15	8,830	15	8,395
Ferro. and Spiegel ..	9,086	9,737	7,508	2	305	2	315
Tennessee	1,750	1,811		1	60	1	60
Total	3,818,897	3,513,683	2,372,664	182	173,790	172	119,905

Production of Coke Pig Iron and Ferromanganese

(All Figures in Net Tons)

	Pig Iron*		Ferro-manganese†	
	1940	1939	1940	1939
January ..	4,032,022	2,436,474	43,240	23,302
February ..	3,311,480	2,307,409	38,720	20,894
March ...	3,270,499	2,681,969	46,260	17,928
April	3,137,019	2,302,918	43,384	12,900
May	3,513,683	1,923,618	44,973	8,835
June	3,818,897	2,372,665	44,631	18,611
½ year ..	21,083,600	14,025,053	261,208	102,470
July		2,639,022		23,758
August ...		2,978,991		23,103
September ..		3,223,983		24,583
October ...		4,062,901		26,817
November ..		4,166,888		33,999
December ..		4,220,536		40,654
Year ...		35,317,374		275,384

*These totals do not include charcoal pig iron. †Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	1940	% Ca-pacity	1939	% Ca-pacity	1938
January ..	130,061	85.8	78,596	51.5	51,632
February ..	114,189	75.1	82,407	54.0	51,931
March ...	105,500	68.9	86,516	56.8	52,476
April	104,567	68.6	76,764	50.4	51,376
May	113,345	74.8	62,052	40.8	45,343
June	127,297	83.9	79,089	51.7	39,648
½ year ..	694,959	76.1	77,486		48,717
July			85,130	55.8	43,417
August ...			96,096	62.9	53,976
September ..			107,466	70.4	62,737
October ...			131,061	85.9	74,147
November ..			138,877	90.9	84,746
December ..			136,146	89.4	79,872
Year ...			96,760		57,633

Merchant Iron Made, Daily Rate

	1940	1939	1938	1937	1936
January ..	16,475	11,875	11,911	18,039	11,801
February ..	14,773	10,793	9,916	18,496	12,652
March ...	11,760	10,025	9,547	18,432	12,131
April	13,656	9,529	9,266	16,259	15,565
May	16,521	7,883	7,203	21,821	14,352
June	13,662	8,527	6,020	17,774	15,914
July		9,404	6,154	21,962	13,013
August ...		11,225	7,408	19,971	13,606
September ..		12,648	12,550	22,473	14,029
October ...		16,409	12,095	21,224	15,282
November ..		16,642	14,793	17,541	16,508
December ..		16,912	10,226	12,280	16,634

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in *Italics*

	July 9, 1940	July 2, 1940	June 11, 1940	July 11, 1939		July 9, 1940	July 2, 1940	June 11, 1940	July 11, 1939
Flat Rolled Steel: (Cents Per Lb.)					Pig Iron: (Per Gross Ton)				
Hot rolled sheets	2.10	2.10	2.10	2.00	No. 2 fdy., Philadelphia..	\$24.84	\$24.84	\$24.84	\$22.84
Cold rolled sheets	3.05	3.05	3.05	3.05	No. 2, Valley furnace ...	23.00	23.00	23.00	21.00
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50	No. 2, Southern Cin'ti...	23.06	23.06	23.06	21.06
Hot rolled strip	2.10	2.10	2.10	2.00	No. 2, Birmingham	19.38	19.38	19.38	17.38
Cold rolled strip	2.80	2.80	2.80	2.80	No. 2, foundry, Chicago†.	23.00	23.00	23.00	21.00
Plates	2.10	2.10	2.10	2.10	Basic, del'd eastern Pa...	24.34	24.34	24.34	22.34
Tin and Terne Plate: (Dollars Per Base Box)					Basic, Valley furnace ...	22.50	22.50	22.50	20.50
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00	Malleable, Chicago†	23.00	23.00	23.00	21.00
Manufacturing ternes ..	4.30	4.30	4.30	4.30	Malleable, Valley	23.00	23.00	23.00	21.00
Bars and Shapes: (Cents Per Lb.)					L. S. charcoal, Chicago ..	30.34	30.34	30.34	28.34
Merchant bars	2.15	2.15	2.15	2.15	Ferromanganese†	120.00	120.00	100.00	80.00
Cold finished bars	2.65	2.65	2.65	2.65	†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.				
Alloy bars	2.70	2.70	2.70	2.70	Scrap: (Per Gross Ton)				
Structural shapes	2.10	2.10	2.10	2.10	Heavy melting steel, P'gh.	\$19.75	\$19.75	\$20.25	\$15.50
Wire and Wire Products: (Cents Per Lb.)					Heavy melting steel, Phila.	19.00	19.50	19.50	15.50
Plain wire	2.60	2.60	2.60	2.60	Heavy melting steel, Ch'go	17.375	17.50	17.75	13.375
Wire nails	2.55	2.55	2.55	2.40	Carwheels, Chicago	19.00	19.00	19.00	12.75
Rails: (Dollars Per Gross Ton)					Carwheels, Philadelphia.	21.75	21.75	20.75	16.00
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00	No. 1 cast, Pittsburgh...	20.75	20.75	20.25	15.25
Light rails	40.00	40.00	40.00	40.00	No. 1 cast, Philadelphia..	21.75	21.75	20.75	16.25
Semi-Finished Steel: (Dollars Per Gross Ton)					No. 1 cast, Ch'go (net ton)	16.75	16.75	17.00	12.25
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00	Coke, Connellsville: (Per Net Ton at Oven)				
Sheet bars	34.00	34.00	34.00	34.00	Furnace coke, prompt...	\$4.25	\$4.00	\$4.00	\$3.75
Slabs	34.00	34.00	34.00	34.00	Foundry coke, prompt ..	5.25	5.25	5.25	4.75
Forging billets	40.00	40.00	40.00	40.00	Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Wire Rods and Skelp: (Cents Per Lb.)					Copper, electro., Conn.*.	11.50	11.50	11.50	10.25
Wire rods	2.00	2.00	2.00	1.92	Copper, Lake, New York.	11.50	11.50	11.50	10.25
Skelp (grv'd.)	1.90	1.90	1.90	1.90	Tin (Straits), New York	51.25	53.00	57.00	48.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 108 to 111 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices . . .

FINISHED STEEL				PIG IRON				SCRAP STEEL			
July 11, 1940.	2.261c. a	Lb.	.....	.....	\$22.61 a	Gross Ton.	.....	.....	\$18.71 a	Gross Ton.	.....
One week ago.	2.261c. a	Lb.	.....	.....	\$22.61 a	Gross Ton.	.....	.....	\$18.92 a	Gross Ton.	.....
One month ago	2.261c. a	Lb.	.....	.....	\$22.61 a	Gross Ton.	.....	.....	\$19.17 a	Gross Ton.	.....
One year ago.	2.236c. a	Lb.	.....	.....	\$20.61 a	Gross Ton.	.....	.....	\$14.79 a	Gross Ton.	.....
	High		Low		High		Low		High		Low
1940	2.261c., Jan.	2	2.211c., Apr. 16	.....	.....	.....	.....	.....	\$19.92, June 18	\$16.04, Apr. 9	
1939	2.286c., Jan. 3	3	2.236c., May 16	\$22.61, Sept. 19	\$20.61, Sept. 12				22.50, Oct. 3	14.08, May 16	
1938	2.512c., May 17	17	2.211c., Oct. 18	23.25, June 21	19.61, July 6				15.00, Nov. 22	11.00, June 7	
1937	2.512c., Mar. 9	9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16				21.92, Mar. 30	12.92, Nov. 10	
1936	2.249c., Dec. 28	28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11				17.75, Dec. 21	12.67, June 9	
1935	2.062c., Oct. 1	1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14				13.42, Dec. 10	10.33, Apr. 29	
1934	2.118c., Apr. 24	24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27				13.00, Mar. 13	9.50, Sept. 25	
1933	1.953c., Oct. 3	3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3				12.25, Aug. 8	6.75, Jan. 3	
1932	1.915c., Sept. 6	6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6				8.50, Jan. 12	6.43, July 5	
1931	1.981c., Jan. 13	13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15				11.33, Jan. 6	8.50, Dec. 29	
1930	2.192c., Jan. 7	7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16				15.00, Feb. 18	11.25, Dec. 9	
1929	2.236c., May 28	28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17				17.58, Jan. 29	14.08, Dec. 3	
Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.				Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.				Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.			

Summary of the Week

A STEADY flow of new steel business, only slightly interrupted by the holiday period last week, and superimposed on fairly large backlogs that have been accumulating in the past several weeks, assures a continued high rate of steel operations for some time to come.

It appears that only the complete cessation of hostilities abroad would change the forward picture for the steel industry, and even then the readjustment might be of a temporary character in view of the probability that such an event would accelerate our own defense program.

While some of the current buying is admittedly of an anticipatory nature, the significant factor in the situation is that present production is based on demands in which the automobile industry, the railroads and the construction industry, the principal peacetime steel outlets, are taking less than average requirements and the national defense program's requirements are largely still to come.

The automobile industry will be taking more steel as it gets farther along in its 1941 model production schedules, the railroads are considering substantial purchases of equipment and rails, and the construction industry should eventually be stimulated by the many projects earmarked for the defense program. With the expansion to be expected in these lines during the next few months, together with the nation's defense needs which will be felt in many directions as plans mature, the probability of capacity operations in the steel industry by the beginning of the fourth quarter, if not sooner, becomes a matter about which there can be little doubt.

Even now some plants are working at capacity, or as close to capacity as conditions permit. The Chicago district has attained a rate of 95 per cent, highest since 1929 and exceeding by one point the peak rate of last fall. This is a gain of three points over the pre-holiday week. Other districts which this week are exceeding their operations of the week before the holiday are Youngstown, Eastern Pennsylvania and the South. However, on the same basis of comparison there have been losses in other districts, notably Pittsburgh, Cleveland and Southern Ohio. At Pittsburgh the rate is only 79 per cent against 83 per cent two weeks ago, two mills having extended their holiday shutdowns into this week, but operations there will undoubtedly be up next week. The rate for the industry is estimated at 87½ per cent, half a point below the figure estimated for the week before last.

In the first half of the year the industry produced 28,678,124 net tons of ingots, equal to 72.64 per cent of capacity. June output was 5,532,910 tons, which was exceeded in all three of the final months of 1939. The six-months total was 37 per cent over the same period last year, while the June figure was 14 per cent over

• High rate of steel operations for some time ahead assured by steady flow of new business on top of fairly heavy backlogs . . . Some plants at capacity now . . . Chicago district hits highest rate since 1929 . . . Scrap still weak

that of May and 57 per cent over that of June, last year.

CURIOSLY, the present situation in the steel industry is not marked by any of the frenzied buying which has characterized some of the periods of high activity in the past. It is admitted that some of the current buying is robbing mills of business which they would normally get later on and that consumers' inventories are heavier than they were a few months ago, but these represent steps which buyers are taking to protect themselves against delays that might arise from priorities exercised on behalf of national defense work. Agricultural machinery manufacturers, for example, are buying steel that ordinarily would not be ordered until October, while metal toy makers are anticipating their seasonal manufacturing for the Christmas trade.

While orders were heavy in the first week of July, exceeding by a small margin those of the last week of June and by a large margin those of the first week of June, they may be in lesser volume during the next few weeks because of the extensive specifying that was done against low-priced sheet and strip commitments. The most important new business immediately in sight is from the railroads, which now have 12,000 freight cars pending. Freight car purchases in June, totaling about 4200 units, were the heaviest since December. The Norfolk & Western has ordered 25,000 tons of rails. Other rail buying is expected.

While defense preparations have not yet stimulated the construction steel products, makers of reinforcing bars have abandoned the presumably unprofitable price levels of the recent past and have reestablished former resale prices on reinforcing bars, representing an advance of \$5 a ton. Larger demand for Connellsville beehive furnace coke has resulted in a price advance of 25c. a ton.

DESPITE continued high steel operating rates, scrap prices continue weak, but the declines are smaller, indicating, perhaps, a point of resistance near at hand. THE IRON AGE scrap composite price has dropped 21c. to \$18.71.

The Industrial Pace . . .

OBSERVANCE of the July 4th holiday throughout industry was the cause of the first interruption to the rise of THE IRON AGE index in five weeks. The decline amounted to 7.1 points, bringing the index down to 80.6 per cent of the base years. While the holiday week drop was larger than in recent years with respect to the number of points lost, on a percentage basis it was just about equal to normal experience.

Heaviest loss was shown by the steel series, followed by the automobile component. The lumber carloading series, the only component to rise in the week, lags one week behind the other factors and hence the rise reflects activity in the pre-holiday week.

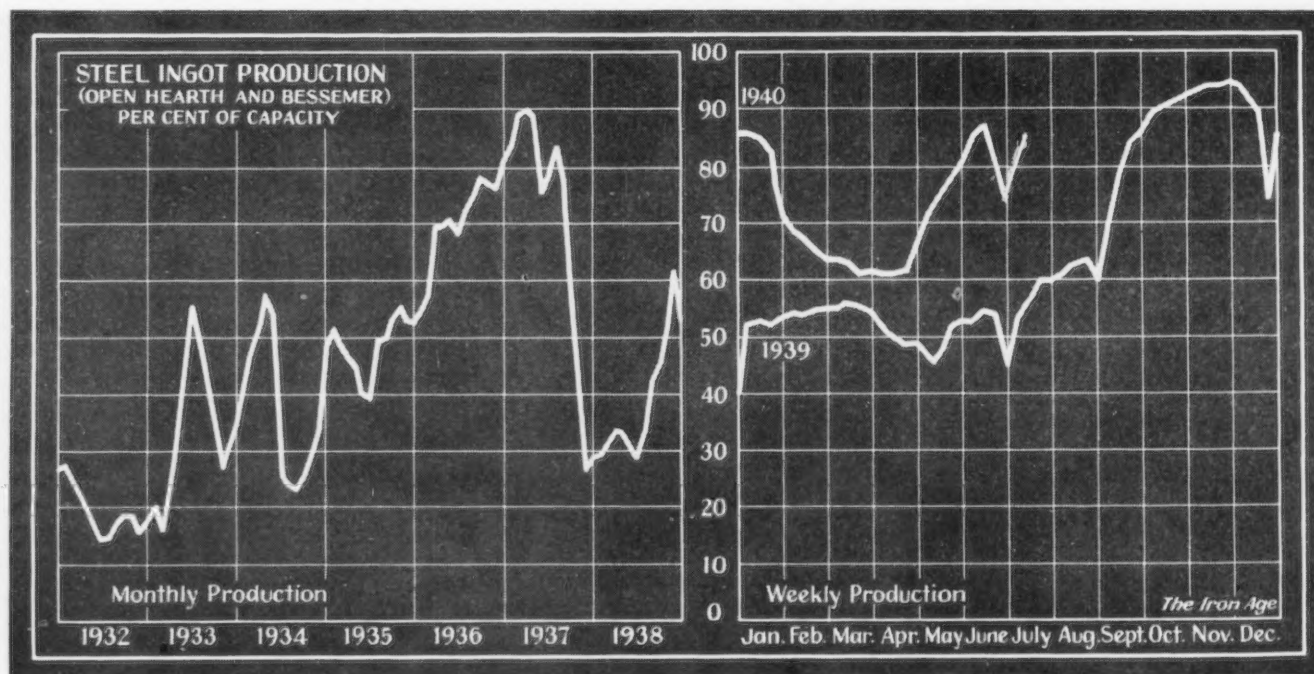
In addition to the holiday week, the approach of the model changeover period was undoubtedly also a factor in the drop in automobile index. The difficulty of statistically locating this changeover period in advance lends a certain amount of inaccuracy, for a brief period, to the seasonal factors employed in making adjustments and which should be taken into consideration in appraising the significance of movement of the automobile series.

Heavy engineering construction awards for the short week were very light, amounting to \$31,599,000. Very few awards were placed during the week connected with the national defense program, but the number of projects of this type on the pending list is steadily expanding.

Output of electric energy in May showed a modest improvement over April, as the accompanying graph indicates. Output is still below March production and also substantially below that of the last quarter of 1940. A comparison with March and the last quarter, however, is faulty without taking into consideration the amount of daylight available each day. Proportion of output generated by waterpower in May showed little change at 40 per cent.

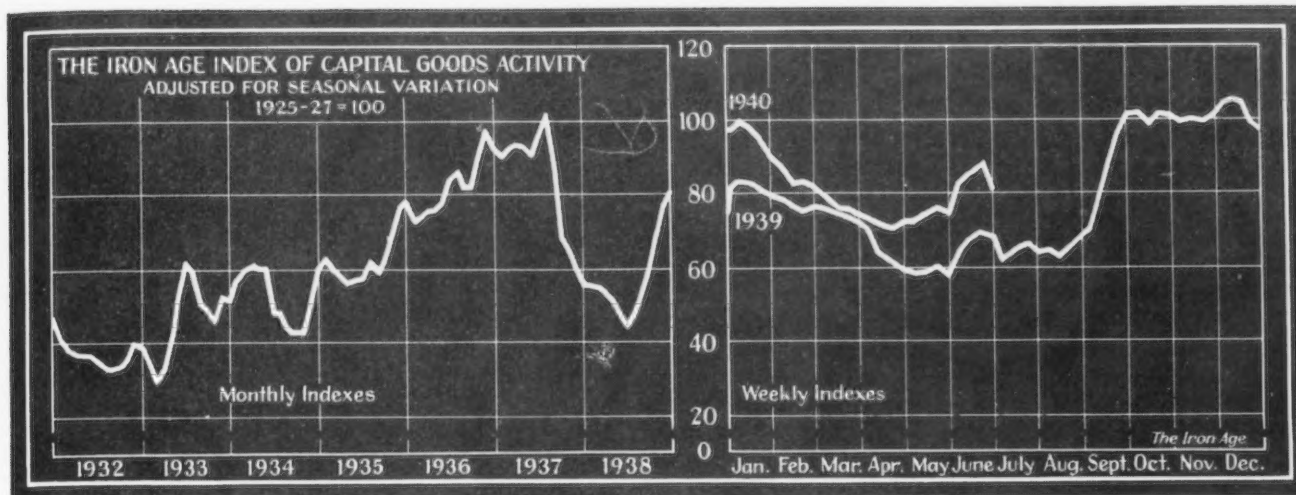
Scrap prices, toward the end of June, reversed the upward trend of the preceding 10 weeks and dropped exactly \$1 in two weeks, as the graph shows. While the change in the trend is partially credited to the new export situation arising out of Italy's entry into the war, price reactions similar to that now taking place have occurred in the past without doing more than temporarily interrupting the upward movement.

Ingots Rate Rebounds to 87½% of Capacity



District Ingot Production, Per Cent of Capacity	Pitts- burgh	Chicago	Valleys	Phila- delphia	Cleve- land	Buffalo	Wheel- ing	Detroit	Southern	S. Ohio River	West- ern	St. Louis	East- ern	Aggre- gate
Current Week	79.0	95.0	89.0	88.0	81.0	100.0	99.0	95.5	96.0	90.0	65.0	76.5	75.0	87.5
Previous Week	66.0	78.5	76.0	79.0	77.0	86.5	94.0	84.0	76.5	62.5	75.0	64.0	70.0	75.0

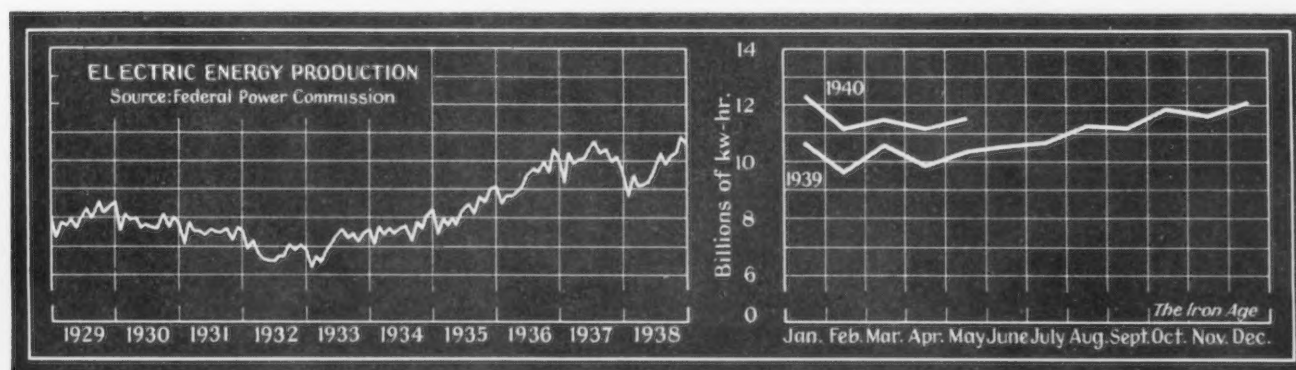
Holiday Causes Recession in Capital Goods Index



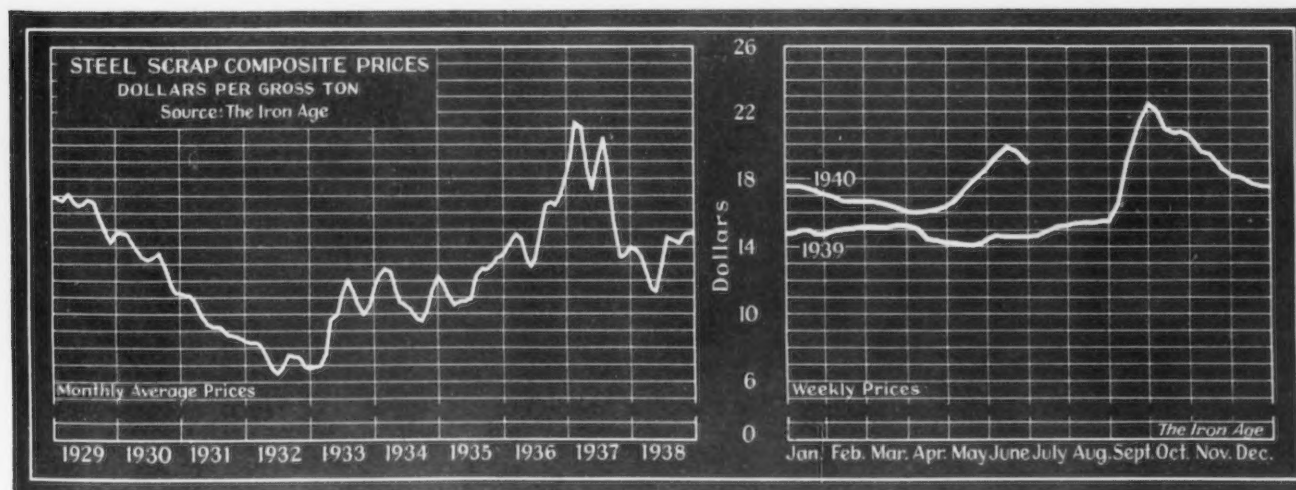
Components	Week Ended	July 6	June 29	June 8	July 8	July 6
Steel ingot production ¹		112.2	132.2	111.3	61.0	137.1
Automobile production ²		61.7	81.3	84.4	48.7	108.5
Construction contracts ³		56.1	57.8	54.3	70.3	120.4
Forest products carloadings ⁴		65.9	61.9	63.6	60.6	117.6
Pittsburgh output and shipments ⁵		107.0	105.4	98.2	69.1	127.9
COMBINED INDEX		80.6	87.7	82.4	61.9	122.3

Sources: ¹THE IRON AGE; ²Wards Automotive Reports; ³Engineering News-Record; ⁴Association of American Railroads; ⁵University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended June 29. Other indexes cover week of July 6.

Electric Energy Output Stepped Up in May



Rise in Scrap Prices Halted; Drop \$1 in Two Weeks



Market News

...THE WEEK'S ACTIVITIES IN IRON AND STEEL

Steel Operations

... Rate for industry snaps back close to pre-holiday week level

As predicted in these columns last week, the steel ingot rate for the industry has snapped back after the holiday shutdowns to almost the rate that prevailed in the pre-holiday week. THE IRON AGE estimates this week's production at 87½ per cent against an estimated 88 per cent in the week before the Fourth of July.

The difference is of no real importance as the trend, based on incoming business, appears to be still upward.

Of the larger districts, only PITTSBURGH and CLEVELAND failed to reach their pre-holiday rate or better. At PITTSBURGH the estimated rate this week is 79 per cent against 83 per cent two weeks ago, two mills in that district having extended their shutdown period into this week. CLEVELAND, at 81 per cent, is four points below its pre-holiday rate. Smaller producing districts which failed to attain their pre-holiday rates are SOUTHERN OHIO and the WEST.

On the other hand, CHICAGO has hit a 95 per cent operation, a half point higher than last fall's peak and the highest rate attained there since 1929. Gains over the pre-holiday week are also recorded at Youngstown, where the rate is 89 per cent, and in the South, which is up to 96 per cent, and in EASTERN PENNSYLVANIA, where operations are averaging 88 per cent. The WHEELING-WEIRTON and BUFFALO districts are operating at virtual capacity.

New Business

... Steady flow of orders assures continued high operations

New steel bookings received by PITTSBURGH mills last week, while slightly below recent weekly averages, were nevertheless only a little below the week before. One mill, in fact, reported new business in excess of the last week of June, despite the loss of one business day due to the Fourth of July holiday.

Incoming tonnage is still in sufficient volume to support operations close to capacity and producers see no indications of a decline in demand in the near future. Backlogs on many products have been increased further and deliveries on standard grades have been extended further. Export demand for most products from neutral countries remains at the recent lower level except in the case of pipe where bookings from South and Central America continued to hold up. Releases on British orders continue in heavy tonnage.

Last week at CHICAGO new business continued to come in at the high levels established during June. Orders are exceeding shipments and backlogs are being added to each week. Backlogs are heaviest at CHICAGO in sheets and strips and merchant bars. Only in sheets is it believed that consumer stocks are being built up substantially, this condition being caused by the heavy ordering resulting from the \$4 a ton concession offered during May and June.

A number of automobile manufacturers were unable to cover at the low sheet prices for the 1941 models and this business is expected later this month at the full published prices. Other than orders from this industry, however, but little sheet buying is expected for some weeks.

Strong demand is reported at CHICAGO for hot rolled bars, semi-finished steel, sheared plate and small shapes. Steel stocks in general in that district are believed to range from 60 to 80 days.

Railroad prospects are particularly good. Not only is a substantial secondary rail program expected, but it is fairly certain that the interest shown over the past few weeks in new rolling stock on the part of the railroads will be continued for some time. Fairly large tonnages of steel will probably also be in demand for repairs of rolling stock.

At Cleveland aggregate steel orders for the first eight days of July were up sharply over the comparable June period. This gain comes despite the letup caused by

the July 4 holiday, and despite the quiet tone of flat rolled steel markets where a lull follows the June 30 deadline on low priced specifications which forced tonnage onto the books of producers.

Among the factors making this month unusually good so far compared with the average July are: Requirements of the British, who have been buying such items as plates, bars and other finished steel requirements of railroad car builders; the placing of orders which ordinarily would not come through until Fall by such industries as agricultural machinery makers.

Despite a slackening in the volume of new business booked in the holiday week in EASTERN PENNSYLVANIA, the week's new orders are estimated to still have been in excess of shipments. Current buying is characterized by efforts to round out inventory piles and to obtain coverage for the fourth quarter. Sellers are reluctant to offer last quarter coverage, but some business of this nature has been booked. The Pennsylvania Railroad's new car program has not yet resulted in purchase orders for steel, but railroad buying for repairs is currently much heavier than a month ago.

Prices

... Former quotations on reinforcing bars are reestablished

Beginning July 2, principal producers began notifying the trade that effective immediately the 2.15c. base price on new billet reinforcing bars and the 2.05c. price on rail steel reinforcing bars would be restored, ending a period of weakness which started around the first of this year.

On 20 tons or more of one size and length, in lengths of 30 ft. or over, shipped at one time, to one destination, there is a deduction of 25c per 100 lb. from the above prices for new billet steel, or 15c per 100 lb. from the above prices for rail steel. These deductions do not apply to lump sum or average pound price quotations.

Pig Iron

... New business gaining in some districts; foundry melt improves

Ordering has picked up substantially in the last 10 days in several areas, notably PITTSBURGH and NEW YORK, and the volume of shipments continues upward. The foundry melt in most districts is higher, the improvement increasing with the distance from the Atlantic seaboard.

CHICAGO shipments of both foundry coke and pig iron are better this month than last, with leading consumers well covered for the third quarter and new buying light. Pig iron business at PITTSBURGH continues at a high level, with users ordering large tonnages for early delivery.

Although the July Fourth holiday curtailed shipment temporarily at CLEVELAND, as elsewhere, the movement of iron has rebounded. CLEVELAND reports shipments abroad from the Great Lakes lighter than in 1939 but finds demand from Canada the strongest in years. Buying in PHILADELPHIA continues light but pressure for early shipment of iron on contract is unabated, the fact that most consumers there are covered through 1940 pointing to a quiet market for the next few months.

The Troy, N. Y., furnace of Republic Steel Corp. was scheduled to start production this week, as was Pittsburgh Coke & Iron Co.'s Sharpsville, Pa., stack and the Mystic Iron Works furnace at Everett, Mass.

Semi-Finished Steel

... Bookings are increasing ... Mills foresee possible shortage

Bookings of semi-finished steel products at PITTSBURGH last week were in lower volume than in the week before owing to one less business day and to the fact that several finishing mills were closed down for the whole week. Backlogs are still increasing with demand continuing at a good rate with most activity being in billets, sheet bars, skelp and shell steel.

New business has been brisk at CLEVELAND, order volume for the first eight days of this month being considerably ahead of the comparable May period.

Releases have been coming through against French orders taken over by the British.

The British Purchasing Commission has finally taken over some of the French orders for shell steel that had been placed in the Chicago district and production has been resumed on these orders at the old rate of specifications. Not all mills in this district with French orders have been given a release on this material, and it is assumed that those with the largest tonnage are being taken over first. Meanwhile, domestic demand for semi-finished steel is increasing constantly. Mill operations are rising week by week and in some cases semi-finished steel is being prorated in the mills to the various finishing departments. To date the shortage of semi-finished steel has not yet become serious, but if backlogs continue to be extended, thus calling for a maintenance of the current high operating rate, a bad situation may develop.

Wire Products

... Holiday affected total demand but backlogs are substantial

Sales of manufacturers' wire and wire rods at PITTSBURGH showed a slight decline in volume last week as compared with the previous period but the substantial bookings of recent weeks have increased mill backlogs to the point where prompt shipment on most sizes is hard to obtain. Demand for merchant wire products has tapered off somewhat now that specifications on low-priced orders have been completed and producers believe that this tonnage will satisfy most of their customers' summer requirements.

The July Fourth holiday had an adverse effect on aggregate orders, production and shipments at CLEVELAND, but this week recovery from the decline is under way. Large tonnage buying is out of the ordinary but July new business holds every promise of being far above normal in manufacturers' wire, rods and special quality wires.

Sales both of merchant products and manufacturers' wire are being maintained at Chicago at last month's satisfactory levels. No orders have been received by local

automobile spring makers for 1941 models, but these are expected momentarily.

Merchant Bars

... Mill backlogs fairly heavy ... Deliveries are extended

Although merchant bar sales at PITTSBURGH last week were in reduced volume because of the holiday, the decline was smaller than expected. In several instances, receipt of heavier specifications over the week-end made up for the loss of one business day. Export business, chiefly from the British, continues as an important factor. Mill backlogs are heavy with delivery periods ranging from two to four weeks, depending on the size.

Still up in the front ranks of bar consumers at CHICAGO are the manufacturers of farm and industrial tractors and agricultural machinery. The small farm tractors introduced last year have been a great success and some manufacturers are considerably behind on orders for these smaller units. Tractor production seems sure to continue at a high level for some time to come. Each week shows increased activity at the plants of Chicago railroad car builders and this is being reflected in total car bookings. Forgers and steel warehouses are also active buyers.

Order volume at CLEVELAND and YOUNGSTOWN during the first eight days of this month was well ahead of the corresponding part of June. Delivery promises are extended on 8-in. and 9-in. mills, these small size bars being generally unavailable for four to six weeks. Agricultural machinery makers are placing orders which ordinarily would come through in October. The export picture has been enlivened by brisk demand from the British.

Beehive Coke

... Furnace grade 25c higher, no change on foundry coke

Increased demand for beehive coke has resulted in an advance of 25c. a ton in this grade to a range of \$4.25 to \$4.50. Independent operators in the Connellsville region have lighted most of their ovens and production of beehive coke at the present is double that of a month ago. Foundry coke prices are unchanged.

Sheets and Strip

... Some final releases against bargain commitments delayed

Producers received the last specifications to be accepted against low-priced sheet and strip commitments last week and are now taking steps to cancel all unspecified tonnages. Most of the orders placed prior to reestablishment of

the market at 2.10c. for hot rolled have now been specified. However, releases on a large part of this steel have still to be sent in and whether or not shipments will be completed by the end of the month remains to be seen. In the case of some consumers, especially the automobile companies, it is expected that data on sizes, etc., will probably be changed before releases are given, as their specifica-

tions were sent in subject to change just prior to the end of June.

According to CHICAGO producers, good sized tonnages of sheets were ordered by the automobile industry during the low price period ended June 30. Only a few of the automobile manufacturers, however, had their 1941 dies on hand so that the correct sizes were known. These few companies are understood to have covered their sheet requirements through the third quarter and perhaps even into the fourth quarter. Most of the other manufacturers of automobiles, not knowing exactly what sizes 1941 models would require, were unable to take substantial advantage of the \$4 a ton reduction and consequently, at this writing, at least, are expected to place orders later this month at the full published prices. With demand for steel being maintained at such a high level, it is considered doubtful that further price difficulties with the automobile industry will arise.

Shipments of low priced sheets will undoubtedly lap over into August and some shipping schedules are understood to have been set as far ahead as Sept. 1.

At CLEVELAND and YOUNGSTOWN this month is off to a slow start on new business, a natural situation following the June 30 deadline on low priced specifications. However, flat rolled markets are not entirely devoid of new tonnage at the higher price.



SAVE SPACE! Kinnear Rolling Doors waste no usable floor, wall or ceiling space. They open out of the way, into a compact coil above the doorway. Materials stored within a few inches of either side do not obstruct their operation.

SAVE TIME! Kinnear Rolling Doors operate rapidly, clearing the entire opening. Kinnear Motor Control permits workmen to close and open doors from any number of convenient points. Snow, ice and swollen ground can't obstruct the doors.

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Factories: Columbus, Ohio and San Francisco, California
Offices and Agents in principal cities

Tubular Goods

... 25,000 tons placed with National Tube for pipe line

New bookings of tubular products at PITTSBURGH during the past week were equal to the volume of the week before despite general observance of the Fourth of July holiday. Demand for mechanical tubing and boiler tubes has picked up slightly while orders for oil country goods and standard pipe remain about the same. An order for about 25,000 tons of 20, 22, and 24 in. line pipe has been placed by Panhandle Eastern Pipe Line Co., Kansas City, with National Tube Co. This pipe will be used in extension of the company's natural gas transmission system from the Texas Panhandle to various points in the Mid-West and will involve about 95 miles of pipe.

Railroad Buying

... Car purchases in June largest since December

Freight car purchases in June, totaling 4235 cars, were the heaviest since December, 1939 according to *Railway Age*. This total does not include 2545 cars placed by Pennsylvania with its own shops. Total car purchases in the first six months of the present year, 10,588 units, are the largest for any comparable period since 1937.

Locomotives purchased in June totaled 31 units, as compared with 20 in May, 50 in April and eight in May, 1939. Locomotives purchased in the first half of 1940 totaled 187 units, as compared with 152 in the corresponding period of 1939.

Although about 12,000 cars are on inquiry, new car purchases in the past week were light. Pennsylvania placed eight light weight passenger cars with E. G. Budd Mfg. Co. and American Refrigerator Transit Co. ordered 100 refrigerator cars from its own shops.

Southern Pacific is seeking bids on 20 locomotives and 121 passenger cars and the Erie has made application for permission to rebuild 325 gondolas at a cost of \$883,809.

Norfolk & Western has purchased 25,000 tons of rails, awarding 18,750 tons to Carnegie-Illinois Steel Corp. and 6250 tons to Bethlehem Steel Co. Negotiations between Inland Steel Co. and Rio Grande do Sul Railway of Brazil for 22,500 tons of rails have not been completed.

Tin Plate

... Operations at 76% this week after holiday shutdowns

Tin plate operations have recovered most of the loss incurred due to the holiday shutdowns last week and output this week is estimated at 76 per cent of capacity. Incoming specifications were in slightly less volume last week and shipments also declined. Deliveries are not expected to regain the June level until later this month. Mill warehouses have heavy stocks, but releases have been improving recently.

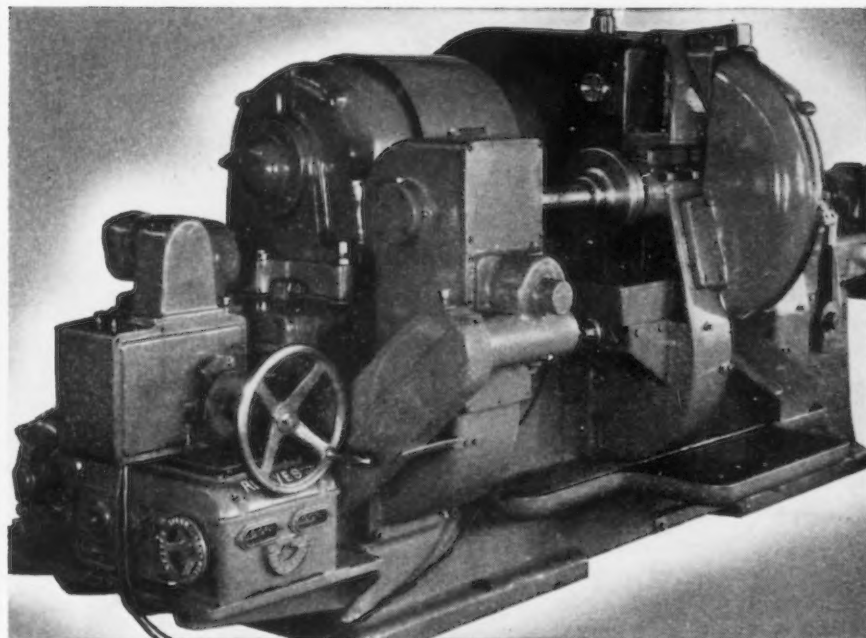
Structural Steel

... Fabricated work, in small volume ... Plain material specifications improve

Structural specifications at PITTSBURGH have expanded slightly in the past 10 days due to numerous industrial programs as well as numerous governmental programs, work on which is being speeded.

Although fabricated structural steel awards at 14,500 tons are higher than those of a week ago, the bulk is in small lots. The only sizable lettings are 1600 tons in San Francisco for a bottling plant for the Acme breweries, and 1300 tons at Ogden, Utah, for a government depot supply building at Hill Field.

New structural steel projects at



RIGHT SPEEDS TAKE "CAN'TS" OUT OF MACHINE PRODUCTION

Accurate finishing to length of the four ends of universal-joint crosses is done easier and faster on this grinding machine because of the speed adjustability provided by the REEVES Variable Speed Transmission. With the aid of REEVES Speed Control, 500 crosses are ground hourly. Merely by turning a handwheel, grinding speeds are varied according to changing diameters of grinding wheels, and work range is greatly increased. You can step up the output of any driven machine by installing a REEVES Speed Control unit. Find out how inexpensively you can do this in your plant. Seasoned engineering service available. Write today for 124-page book G-397, describing the complete REEVES line and its use in 18,000 plants.

REEVES PULLEY COMPANY, Dept. 1, COLUMBUS, INDIANA

REEVES SPEED CONTROL

14,350 tons are slightly lower than last week. The largest inquiries reported are 5000 tons for a state bridge near Hartford, Conn., 2000 tons at San Francisco for the Bank of America Building, and 1100 tons for a glass and lamp plant at Jackson, Miss., for General Electric Co.

Among plate awards of 8875 tons are 3800 tons for tanks at Baltimore for the War Department, and 2275 tons for tanks at Hawaii, also for the War Department.

Significant among shape inquiries from the Pacific Coast was the announcement of the Bank of America that it would construct a new head office in San Francisco now "because it appears likely that construction costs will rise rapidly."

Plates

*... Demand is more active ...
Railroad buying helps*

Demand for light and heavy plates at PITTSBURGH continues

very active with actual bookings received in the past week showing little or no change from the volume of the previous week. The recent increase in new orders has come principally from the railroads and shipbuilders, although miscellaneous bookings continue in good volume.

With railroad equipment requirements and British orders prominent, the month's sales up to July 9 at CLEVELAND were well ahead of the corresponding part of May.

New bookings in EASTERN PENNSYLVANIA in the past week were generally equal to the preceding week on a daily basis. No material for the Pennsylvania Railroad's new car program has been ordered yet, but repair orders are being steadily released. Shipyard demands are at a fairly active pace and tank makers are showing greater activity. Rate of operations at the independent mills this week is higher than in the week preceding the holiday. Deliveries by the independent mills are averaging two weeks, while the larger producers require three to four weeks.

Scrap Stocks

... 6,669,000 Tons at end of March

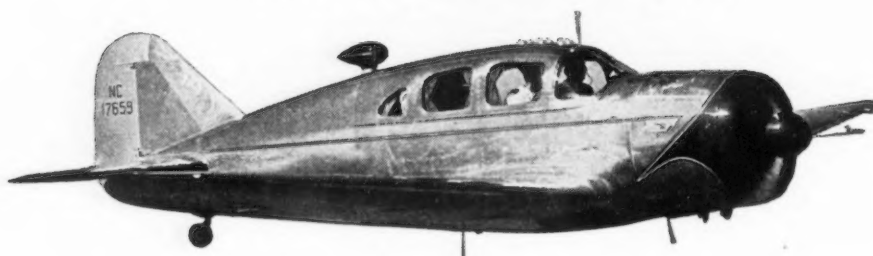
Domestic steel scrap stocks at consumers' and suppliers' plants and in transit at the end of March, 1940, approximated 6,669,000 gross tons, according to the quarterly survey of the Bureau of Mines made public on Tuesday. This was a decline from 7,302,000 tons reported at the end of December, 1939.

At the same time the bureau announced that domestic consumption of iron and steel scrap amounted to 32,434,407 gross tons in 1939, an increase of 52 per cent over 1938. The use of pig iron as a raw material in the manufacture of steel increased 73 per cent whereas the quantity of scrap charged into steel furnaces increased 56 per cent.

Included in the total of 6,669,000 tons of scrap stocks at the end of the first quarter are 2,380,000 tons on hand or in transit to suppliers' yards and an estimated 4,289,000 tons of purchased home scrap on hand and in transit to consumers' plants compared with 2,560,668 tons and 4,741,000 tons

THE SWING'S TO

STAINLESS!



• From drawing-board to airplane production lines in a few years is the record of stainless steel. Such advantages as light weight, strength, rigidity, resistance to heat and corrosion put it there. Now aircraft manufacturers know another important reason:

IT'S GOOD DOLLARS AND CENTS BUSINESS

With ARMCO Stainless Steel, you can use the fast spot-welding process. Heat treatments and slow riveting methods are out. This means swifter production, lower costs and opportunities for more flexible design.

You may not build aircraft or airplane parts, but there's a good chance you can cut costs and make more money by using ARMCO Stainless Steels. These rustless metals draw

and form readily, polish easily and have excellent welding properties. In fact you'll be delighted to know how many new selling points your products can boast.

Why not try ARMCO Stainless Steel on that next order? Or if you would like more information about this durable metal, just write The American Rolling Mill Company, 1770 Curtis St., Middletown, Ohio.

ARMCO



STAINLESS STEELS

respectively, on Dec. 31. Inventories held by the larger suppliers reporting in both canvasses increased 4 per cent while railroad stocks were again 14 per cent lower. The estimate of consumers' stocks is based on the assumption that companies reporting their inventories held 94 per cent of the total stocks on hand at the plants of 761 consumers.

Scrap consumption in March amounted to 2,906,000 tons, indicating that known stocks held by consumers and suppliers at the end of the first quarter were equivalent to a 10-weeks' supply compared with an eight-weeks' supply on Dec. 31 at the rate of consumption of 3,773,000 tons in that month. In Western Pennsylvania reported stocks of purchased and home scrap were equivalent to a seven-weeks' supply at the estimated rate of consumption in March.

Stocks of pig iron at the end of March totaled 3,407,000 tons compared with 3,369,000 tons at the end of 1939.

The survey showing consumption of scrap and pig iron last year reveals that the portion of home scrap used decreased from 27.2 per cent in 1938 to 26.4 per cent in 1939, while the decrease in the portion of purchased scrap was more pronounced, the percentage dropping from 22.8 in 1938 to 21 in 1939. Production of steel ingots increased 66 per cent. The use of pig iron at foundries increased 51 per cent while the quantity of scrap charged in furnaces increased 40 per cent.

Reinforcing Bars

... Resale price advanced to 2.15c. on billet steel quality

Producers have advised their district offices that effective on all new business the resale price of new billet steel reinforcing bars will be 2.15c. a lb. f.o.b. Pittsburgh. This represents an advance of 25c. per 100 lb. over the price set a few weeks ago and represents efforts of producers to establish reinforcing bar prices on a more profitable basis. (Further details under heading "Prices.")

Among reinforcing steel awards of 8260 tons, the only sizable letting is 1475 tons for the Grand Coulee Dam and pumping plant at Odair, Wash.

Pittsburgh Steel May Buy Old National Works

Pittsburgh

Negotiations are going on between Pittsburgh Steel Co. and Carnegie Illinois Steel Corp. for the purchase of some of the property of Carnegie's idle tin mill plant at Monessen, Pa. The extent of the purchase has not yet been settled.

J. & L. Buys Hajoca Property in Philadelphia

Pittsburgh

Jones & Laughlin Steel Corp., Pittsburgh, has acquired a 7½-acre tract of land in Philadelphia from the Hajoca Corp. This land includes factory and foundry buildings which Hajoca will continue to use for the distribution of pipe and the manufacture of pipe fittings.



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Conveyorized Immersion Degreaser Used On Heavy Stampings.

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Machine Tools

... SALES, INQUIRIES AND MARKET NEWS

Volume of Buying Increasing

New York

••• Use of negotiated contracts by government agencies is speeding up the placing of munitions work in this area, and as a result the volume of both orders and inquiries for machine tools has increased in the past two weeks. Machinery is being bought for the manufacture of medium caliber guns, anti-tank guns and ammunition. Local concerns that have regularly been doing work for the Navy are subletting contracts to other firms in the vicinity which up until now had not been engaged in even related work. The Navy also is buying machinery. Meanwhile there is no let-up in the demands of the aircraft engine and aircraft parts industry, which continues to get priorities on orders.

Detroit Trade More Active

Detroit

••• Determination of Packard Motor Car Co. as the firm to receive the government order for manufacture of 9000 Rolls Royce engines has shifted major machine tool interest from Ford to Packard. Preliminary estimates indicate that \$30,000,000 will be spent on the project, mostly for machines, tools, jigs and fixtures. The post-holiday reaction in the machine tool trade is distinctly upward following some weeks of uncertainty which preceded it. Doubling of facilities by the Detroit Deisel Engine division of General Motors and further steps in converting the old Ryan Bohn foundry at Lansing into the heavy pressed metals division of Oldsmobile contribute to a degree of ma-

chine tool activity which is unusual in the Detroit area at this time of year. Meanwhile, tool and die shops will finish up 1940 automobile programs by Aug. 1.

June Bookings Made Big Gain

Chicago

••• Official tabulation of June sales at Chicago machine tool offices revealed that bookings exceeded those of May by margins ranging from 50 to 75 per cent. The outstanding single order placed during June was probably that of the International Harvester Co. which is increasing production on two small tractors made at the Chicago tractor works.

The Rock Island Arsenal is inquiring for equipment. The Chicago office of the Ordnance Department has placed no new educational orders but studies and investigation are underway on many phases of the defense program. The decision of those in control of the national defense program to eliminate the delays occasioned by competitive bidding in the acquisition of machine tools and other vital equipment, is being welcomed.

Tools Subject to License Control

Cleveland

••• The machine tool industry is set to conform closely to the Presidential proclamation of July 2 placing essential materials, including machine tools, under export licensing control. Producers from now on will apply to the State Department for a license upon receipt of a foreign order, and orders now on the books will be reviewed by the department. In all probability the result will be a reduction of shipments to Japan and Russia, while Great Britain's orders will proceed without much trouble.

The French contracts taken over by the British are estimated unofficially to involve around 11,500 machines.

Large orders for a machine tool producer's plant addition have been the feature of the local market during the past two weeks.

STANDARD S. A. E. ALLOY STEELS IN STOCK

For those who prefer standard numbered steels we have

2315	3140	X4130 (Aircraft)
4615	3145	X4340 (Aircraft)
	X4340	
3130	6145	4140
3135	6150	4150

For those who wish to take advantage of constant metallurgical improvement and development long before they are incorporated in S.A.E. standards, or where close selection of material for analysis, grain size, control and quality is desired, we offer

ALLOY



GRADES

THE HY-TEN OF TODAY IS THE STANDARD STEEL OF TOMORROW

"A" IX

"B" 2

"B" 4

"B" 43

"A" 15

"B" 3X

"B" 5

"M" Temper

Rounds
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BARS and FORGINGS

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CAMBRIDGE
CLEVELAND
CINCINNATI
CHICAGO

WHEELOCK, LOVEJOY & CO., INC.

Send for Data Sheets

Warehouses
DETROIT
NEWARK
BUFFALO

Non-Ferrous Metals

... MARKET ACTIVITIES AND PRICE TRENDS

New York, July 9—Throughout the past week consumers displayed an inclination to sit on the sidelines and await developments before adding further to existing commitments. Traders have not yet been able to fully digest the significance of the government's tin buying program and are extremely wary of taking positions. Adding to that the fact that domestic consumers all covered very heavily through May and June, it becomes apparent that the present quietness will likely not have any detrimental effect upon price sentiment in general.

The downward drift of copper prices over the past two weeks continues, with custom smelter sales being reported at 10.875c. per lb., Connecticut Valley, at the close of the week. Export prices also moved lower, with little buying interest in evidence. Mine producers continue to quote 11.50c. a lb.

Zinc

Reflecting the lethargy that dominated all the non-ferrous markets in the holiday week, sales of prime Western metal in the period were only 850 tons, as compared with 5901 tons in the preceding week. Shipments also were off in the week, but the decline did not disturb prices which continue unchanged at 6.64c. a lb., New York. Sellers are bulwarked with sizable backlogs and the current dullness will not likely have any important influence on the price structure. Stocks at the close of June amounted to 70,673 tons, as against 75,036 at the end of May.

Tin

Trading was at a halt all during the past week as the market studied the possible effects of the government's plan to buy 75,000 tons of tin. Prices showed little change during the week with 52c. representing the high of the period's movement and 51.25c., today's New York price for Straits, the low. As part of the agreement with the R.F.C., the International

Control Committee has increased quotas to 130 per cent for a period of one year, beginning July 1. Previously, the committee had set 100 per cent quotas for the third quarter. To all effects the new quotas represent unrestricted production and the trade is interested in observing what effect this will have on actual output. There have been some offerings made to the government under the new plan, but the buying mechanism has not been completely organized as yet and no material has been accepted.

Lead

A slow demand for prompt carloads characterized the market throughout the short week. Consumers have bought practically all the lead they will need in June and

about one-third of August's requirements and, in sympathy with other non-ferrous markets, are content for the time being to stay on the sidelines. Prices are unchanged at 5c. a lb., New York.

June Average Prices

Average prices of the major non-ferrous metals in June, based on quotations appearing in THE IRON AGE, were as follows:

	Per Lb.
Electrolytic copper, Conn. Valley...	11.50c.*
Lake copper, Eastern delivery	11.50c.
Straits tin, spot, New York	54.64c.
Zinc, East St. Louis	6.24c.
Zinc, New York	6.63c.
Lead, New York	5.00c.
Lead, St. Louis	4.85c.

*Mine producers only.

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for one man to handle
sheet steel—faster—safer—
cheaper.

● Here is a one man end control lifter that picks up and carries packs of sheet steel without a kink or scratch. C-F Sheet Lifters are made to "cradle" tons of flat metal as if they were glass—a few seconds for adjustments and the tongs with automatic "take-up" grip the load—safely, carefully—for crane travel. They lift or set down with minimum clearances between piles.



C-F Sheet Lifters save money in material handling because they carry bundles instead of single sheets—because they need as little as 6" of space to operate on each side of a stack, reducing storage room and because they work fast with safety for both material and operator.

● C-F Sheet Lifters are made to handle from 2 to 60 tons of sheet steel, tin-plate, ingot molds, paper rolls, pipe, tubing, castings, tote boxes, flasks, skids or special designs to suit requirements. Write for Bulletin SL-18.

CULLEN-FRIESTEDT CO.
1303 S. Kilbourn Ave., Chicago, Ill.

Scrap

... MARKET ACTIVITIES AND QUOTATION TRENDS

••• Reflecting the almost complete absence of new mill buying and adverse sentiment created by uncertainties abroad, weakness continues in scrap prices generally. As gaged by the composite price, however, the drop of only 21c. this week to \$18.71, as compared with a drop of \$1 for the previous fortnight would indicate that the current decline is reaching bottom, particularly since there is evidence of a rebounding ingot rate following the holiday week. At Pittsburgh, ordinary No. 1 steel is nominally unchanged in price, although railroad heavy melting is off 50c. July railroad lists in other centers, like Cleveland, also showed a 50c. drop from the June level. Quotations have been marked down 50c. at Philadelphia, largely on the basis of broker buying, and at Chicago the average price for No. 1 is down 12½c. on the basis of broker coverages of the last mill sale. Biggest decline in quotations took place at Cleveland, with prices down 75c. Youngstown prices are down 50c. Dealer buying prices are generally lower and at St. Louis some offers have been dropped by as much as \$1.50. Firmness is still seen in the export market, despite curtailed activity.

Youngstown

Shipments are regaining strength after the July 4 holiday. Two open-hearth plants in central Ohio were down until late Friday. No. 1 heavy melting steel is quoted off 50c. a ton to a range of \$19.50 to \$20, most prices being nominal. The change is based on the weakness in the recent railroad list at Cleveland and other indicators. Not much buying of scrap is expected in July.

Cleveland

Most of the steel sold on the principal local railroad list brought 50c. a ton lower than a month ago, although a few hundred tons went for practically the same price, \$20.50, as attained in the previous sale. No. 1 heavy melting steel is quoted lower by 75c. this week to a range of \$18.75 to \$19.25 a ton. Dealers report some difficulty in picking up material freely at present levels. The outlook for the next few weeks is continued quiet, despite the fact open-

hearth operations hold every promise of maintaining their present high level.

Buffalo

The market here showed little or no activity and not much change this week. Weaker sentiments have been expressed in some quarters but so far they have not been substantiated. One of the leading district consumers is said to have offered a price within the prevailing range but no sales were made. Cast scrap remains dull.

St. Louis

The scrap iron market at St. Louis took another tumble this week, price reductions ranging from 25c. to \$1.50 a ton, with most cut 50c. a ton. Heavy offerings plus a disinclination of mills to make further commitments caused the weakness. A district foundry took an undisclosed tonnage of specialties, but no deals are pending for melting steel. Railroad lists: Louisville & Nashville, 7800 tons; Wabash, 2200 tons; Missouri Pacific, 1500 tons; Gulf Coast Lines, 1000 tons and St. Louis-Southwestern, 220 tons.

Birmingham

Continued weakness is reflected in the scrap market with indications pointing to a continuation until Aug. 1. Local stocks are not extensive, but are adequate for all calls at the present moment. Lack of bottoms for export continues to be the reason for the developments here at a time when it was expected there would be a definite show of vitality. Prices remain unchanged over last week's quotations.

Boston

A Weirton consumer was in the market for steel turnings last week and for this business brokers are paying \$8.15 a ton on cars, contrasted with \$8.40 a ton for the last Weirton shipment. Generally, prices are holding at former levels with business at a minimum. The trade looks for no improvement in business until after the Democratic convention is out of the way.

Pittsburgh

New sales into consumption here during the past 10 days have been few and far between, with buyers and sellers alike awaiting further developments. Because of the current slowness, more than usual interest is being shown in the closing of the Pennsylvania Railroad list this week, with many brokers awaiting the outcome before taking new positions. Pending additional representative sales, No. 1 heavy melting steel remains nominally unchanged at \$19.50 to \$20, with only a few minor changes being made in other grades. Brokers have been able to pick up small tonnages of No. 1 steel at \$19 but

with steel production continuing at a high rate the undertone of the market remains fairly steady.

Chicago

During the past week this market has evidenced little activity. Mills can and have bought heavy melting steel at \$17.50, but only in small quantities. Some mill purchasers have turned down offers at that price. Brokers this week are able to fill their needs at \$17.25, but not a great volume of trading is being done. Two railroad lists were sold last week at prices equaling about \$17.75 delivered Chicago district mills.

Philadelphia

Largely on the basis of broker buying, quotations here have been marked down 50c. on most of the steel making grades. Trading continues on a very limited basis with both consumers and brokers reluctant to do business until the length and strength of the present trend becomes more apparent. Buying for export continues on the basis of \$17.50 for No. 1, and \$16.50 for No. 2. Open-hearth operations in this district have rebounded to 88 per cent, two points above the pre-holiday week. At least two mills are operating all available furnace facilities.

Cincinnati

Within the last few weeks scrap had been moving out of this territory into the Valleys and even to Pittsburgh, but with the drying up of those markets as well as the local one, further softening has taken place in dealer buying prices, which are down 50c. this week after a similar decline last week. Uncertainties over the European war have also taken their toll in market confidence.

Detroit

Absence of mill buying and indications of an intent to wait further developments in price movements before buying is started are contributing factors to a further weakness this week, moving prices downward again 50c. a ton.

New York

Recent large mill sales were covered in the space of little over a week and although heavy shipments are going forward both to eastern Pennsylvania and to Buffalo, there is practically no new buying. Trading is particularly dull in No. 2 steel. Prices for scrap on cars are nominally unchanged, with the exception of stove plate which has been adjusted downward. Export buying prices are much firmer, although No. 2 steel is softer because of the present over supply in relation to No. 1. No new export buying is reported.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$19.50 to \$20.00
Railroad heavy mltng.	20.50 to 21.00
No. 2 heavy mltng.	17.50 to 18.00
Railroad scrap rails	21.50 to 22.00
Rails 3 ft. and under	24.50 to 25.00
Comp. sheet steel	19.50 to 20.00
Hand bundled sheets	18.50 to 19.00
Heavy steel axle turn.	18.50 to 19.00
Machine shop turnings	13.50 to 14.00
Short shov. turnings	15.50 to 16.00
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Cast iron carwheels	20.00 to 20.50
Heavy breakable cast	16.50 to 17.00
No. 1 cupola cast	20.00 to 20.50
RR. knuckles & coup.	25.00 to 25.50
Rail coil springs	25.00 to 25.50
Rail leaf springs	25.00 to 25.50
Rolled steel wheels	25.00 to 25.50
Low phos. billet crops	25.00 to 26.00
Low phos. punching	24.50 to 25.00
Low phos. heavy plate	23.50 to 24.00
Railroad malleable	23.50 to 24.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$19.60
No. 2 hvy. mltng. steel	17.50
Hydraulic bund., new	19.00
Hydraulic bund., old	16.00
Steel rails for rolling	\$22.00 to 22.50
Cast iron carwheels	21.50 to 22.00
Hvy. breakable cast	19.00 to 19.50
No. 1 cupola cast	21.50 to 22.00
Mixed yard (f'd y) cast	18.50 to 19.00
Stove plate (steel wks.)	15.50 to 16.00
Railroad malleable	22.50 to 23.00
Machine shop turn.	13.00 to 13.50
No. 1 blast furnace	11.50 to 12.00
Cast borings	11.50 to 12.00
Heavy axle turnings	16.50 to 17.00
No. 1 low phos. hvy.	24.00 to 24.50
Couplers & knuckles	24.00 to 24.50
Rolled steel wheels	24.00 to 24.50
Steel axles	23.00 to 23.50
Shafting	24.50 to 25.00
Spec. iron & steel pipe	17.00 to 17.50
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton

Hvy. mltng. steel	\$17.25 to \$17.50
Auto. hvy. mltng. steel	
alloy free	16.25 to 16.50
No. 2 auto steel	13.75 to 14.25
Shoveling steel	17.25 to 17.50
Factory bundles	16.75 to 17.00
Dealers' bundles	15.25 to 15.50
No. 1 busheling	16.25 to 16.50
No. 2 busheling, old	8.00 to 8.50
Rolled carwheels	20.00 to 20.50
Railroad tires, cut	21.00 to 21.50
Railroad leaf springs	18.50 to 19.00
Steel coup. & knuckles	20.00 to 20.50
Axle turnings	16.25 to 16.75
Coil springs	22.00 to 22.50
Axle turn. (elec.)	17.75 to 18.25
Low phos. punchings	20.00 to 20.50
Low phos. plates 12 in.	
and under	20.50 to 21.00
Cast iron borings	10.50 to 11.00
Short shov. turn.	11.50 to 12.00
Machine shop turn.	11.50 to 12.00
Rerolling rails	22.00 to 22.50
Steel rails under 3 ft.	19.75 to 20.25
Steel rails under 2 ft.	21.00 to 21.50
Angle bars steel	20.00 to 20.50
Cast iron carwheels	18.75 to 19.25
Railroad malleable	22.00 to 22.50
Agric. malleable	14.75 to 15.25

Per Net Ton

Iron car axles	23.50 to 24.00
Steel car axles	22.50 to 23.00
Locomotive tires	15.00 to 15.50
Pipes and flues	11.50 to 12.00
No. 1 machinery cast	16.50 to 17.00
Clean auto. blocks	17.00 to 17.50
No. 1 railroad cast	15.00 to 15.50
No. 1 agric. cast	13.50 to 14.00
Stove plate	10.75 to 11.25
Grate bars	12.50 to 13.00
Brake shoes	12.50 to 13.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$19.50 to \$20.00
No. 2 hvy. mltng. steel	18.50 to 19.00
Low phos. plate	21.00 to 21.50
No. 1 busheling	18.75 to 19.25
Hydraulic bundles	19.00 to 19.50
Machine shop turn.	13.50 to 14.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$18.75 to \$19.25
No. 2 hvy. mltng. steel	17.75 to 18.25

Comp. sheet steel	\$18.25 to \$18.75
Light bund. stampings	15.00 to 15.50
Drop forge flashings	17.50 to 18.00
Machine shop turn.	12.00 to 12.50
Short shov. turn.	12.50 to 13.00
No. 1 busheling	18.25 to 18.75
Steel axle turnings	17.75 to 18.25
Low phos. billet and bloom crops	23.50 to 24.00
Cast iron borings	12.25 to 12.75
Mixed bor. & turn.	12.25 to 12.75
No. 2 busheling	12.25 to 12.75
No. 1 cupola cast	20.50 to 21.00
Railroad grate bars	14.00 to 14.50
Stove plate	14.00 to 14.50
Rails under 3 ft.	23.50 to 24.00
Rails for rolling	23.50 to 24.00
Railroad malleable	22.00 to 22.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$19.00 to \$19.50
No. 2 hvy. mltng. steel	17.00 to 17.50
Scrap rails	22.00 to 22.50
New hvy. b'nded sheets	17.00 to 17.50
Old hydraul. bundles	15.50 to 16.00
Drop forge flashings	17.00 to 17.50
No. 1 busheling	17.00 to 17.50
Machine shop turn.	11.50 to 12.00
Shov. turnings	13.00 to 13.50
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Knuckles & couplers	23.00 to 24.00
Coil & leaf springs	23.00 to 24.00
Rolled steel wheels	23.00 to 24.00
No. 1 machinery cast	20.00 to 20.50
No. 1 cupola cast	18.50 to 19.00
Stove plate	16.00 to 16.50
Steel rails under 3 ft.	24.00 to 25.00
Cast iron carwheels	18.50 to 20.00
Railroad malleable	23.00 to 23.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$15.75 to \$16.75
No. 1 hvy. melting	15.50 to 16.00
No. 2 hvy. melting	14.50 to 15.00
No. 1 locomotive tires	18.00 to 18.50
Misc. stand. sec. rails	18.00 to 18.50
Railroad springs	18.50 to 19.00
Bundled sheets	11.00 to 11.50
Cast bor. & turn.	8.00 to 8.50
Machine shop turn.	9.50 to 10.00
Heavy turnings	13.00 to 13.50
Rails for rolling	19.00 to 19.50
Steel car axles	20.50 to 21.00
No. 1 RR. wrought	13.00 to 13.50
No. 2 RR. wrought	14.00 to 14.50
Steel rails under 3 ft.	20.00 to 20.50
Steel angle bars	18.00 to 18.50
Cast iron carwheels	18.00 to 18.50
No. 1 machinery cast	18.50 to 19.00
Railroad malleable	18.00 to 18.50
Breakable cast	15.50 to 16.00
Stove plate	11.00 to 11.50
Grate bars	13.00 to 13.50
Brake shoes	12.00 to 12.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	\$14.50 to \$15.00
No. 2 hvy. mltng. steel	13.00 to 13.50
Scrap rails for mltng.	20.00 to 20.50
Loose sheet clippings	9.25 to 9.75
Hydrau. b'nded sheets	13.75 to 14.25
Cast iron borings	6.00 to 6.50
Machine shop turn.	7.00 to 7.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	4.75 to 5.25
Rails for rolling	21.50 to 22.00
No. 1 locomotive tires	16.00 to 16.50
Short rails	22.00 to 22.50
Cast iron carwheels	16.00 to 16.50
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	17.00 to 17.50
Burnt cast	10.50 to 11.00
Stove plates	10.50 to 11.00
Agricul. malleable	15.00 to 15.50
Railroad malleable	18.00 to 18.50
Mixed hvy. cast	15.75 to 16.25

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	\$16.50
No. 2 hvy. melting steel	15.50
No. 1 busheling	14.00
Scrap steel rails	15.00
Steel rails under 3 ft.	17.50
Rails for rolling	17.50
Long turnings	5.00
Cast iron borings	7.50
Stove plate	11.00
Steel axles	18.00
No. 1 RR wrought	14.00
No. 1 cast	16.00
No. 2 cast	12.50
Cast iron carwheels	13.00
Steel car wheels	16.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting	\$14.50 to \$15.00
No. 2 heavy melting	13.50 to 14.00
Borings and turnings	10.00 to 10.50
Long turnings	9.50 to 10.00
Short shov. turnings	10.50 to 11.00
No. 1 cast	19.00 to 19.50
Automotive cast	19.00 to 19.50
Hvy. breakable cast	15.50 to 16.00
Stove plate	12.00 to 12.50
Hydraul. Comp. sheets	16.50 to 17.00
New busheling	15.00 to 15.50
Sheet clips	13.50 to 14.00
Flashings	14.50 to 15.00
Low phos. plate	17.50 to 18.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	\$14.50 to \$15.00
No. 2 hvy. mltng. steel	13.00 to 13.50
Hvy. breakable cast	15.00 to 15.50
No. 1 machinery cast	17.50 to 18.00
No. 2 cast	15.00 to 15.50
Stove plate	11.50 to 12.00
Steel car axles	20.00 to 20.50
Shafting	20.00 to 20.50
No. 1 RR. wrought	14.50 to 15.00
No. 1 wrought long	13.00 to 13.50
Spec. iron & steel pipe	12.00 to 12.50
Rails for rolling	16.50 to 17.50
Clean steel turnings	8.50 to 9.00
Cast borings	8.50 to 9.00
No. 1 blast furnace	8.50 to 9.00
Cast borings (chem.)	10.00 to 11.00
Unprepared yard scrap	8.50 to 9.00
Light iron	6.50 to 7.00

Per gross ton delivered local foundries:

No. 1 machin. cast	\$19.00 to \$20.00
No. 2 cast	18.00 to 18.50

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	\$14.00 to \$14.25
Machine shop turn.	8.15
Mixed bor. & turn.	6.00 to 6.25
Bun. skeleton long	11.25 to 11.50
Shafting	18.50 to 18.75
Stove plate	11.00 to 11.25
Cast bor. chemical	8.00 to 8.50
Per gross ton delivered consumers' yards:	
Textile cast	\$17.00 to \$19.00
No. 1 machine cast	17.00 to 19.00

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel	\$14.00 to \$14.50
No. 2 steel	13.00 to 13.50

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	\$13.00	\$13.00	\$14.00
No. 2 hvy. mltng. steel	12.00	12.00	13.00
Bundles	11.00	11.00	12.00

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	\$11.50	\$11.00
No. 1 hvy. mltng. steel	11.25	10.75
No. 2 hvy. mltng. steel	10.00	9.50
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.25	6.75
Cast borings	6.75	6.25
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	14.50	13.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, charges	
No. 1 hvy. mltng. steel	\$15.50 to \$16.00
No. 2 hvy. mltng. steel	13.50 to 14.50
No. 2 cast	14.00
Stove plate	12.25 to 12.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel	\$15.50 to \$16.00
No. 2 hvy. mltng. steel	14.00 to 14.50
Rail (scrap)	15.50 to 16.00
Stove plate	12.25 to 12.50

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel	\$17.50
No. 2 hvy. mltng. steel	16.50

Construction Steel

...STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings advance to 14,500 tons from 11,750 tons last week; new projects slightly lower at 14,350 tons; plate awards total 8875 tons.

AWARDS

NORTH ATLANTIC STATES

- 900 Tons, Kearny, N. J., warehouse for American Stores Co., to American Bridge Co., Pittsburgh.
- 700 Tons, Pittsburgh, extension, James H. Reed power station for Duquesne Light Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 610 Tons, New Kensington, Pa., office building extension for Aluminum Co. of America, to American Bridge Co., Pittsburgh.
- 610 Tons, Lockport, N. Y., Harrison division General Motors Corp., to Ingalls Iron Works Co., Birmingham.
- 560 Tons, Mechanicville, N. Y., boiler house addition and supports for West Virginia Pulp & Paper Co., to F. M. Weaver & Co., Lansdale, Pa.
- 445 Tons, Washington, utility shop for Navy Department, to Barber & Ross, Washington.
- 400 Tons, Brooklyn, reinforcing building for E. R. Squibb & Sons, to American Bridge Co., Pittsburgh.
- 375 Tons, Bayonne, N. J., case structures, Tide Water Associated Oil Co., to Bethlehem Fabricators, Inc., Bethlehem, Pa.
- 325 Tons, New York, apartment building, 336 East 52nd Street, to Simon Holland & Son Co., Brooklyn.
- 300 Tons, Rochester, hospital building for Rochester University, to F. L. Hughes & Co., Rochester.
- 275 Tons, Tionesta, Pa., State highway bridge, to American Bridge Co., Pittsburgh.
- 250 Tons, Milford, Conn., building for U. S. Electrical Motors, Inc., to Belmont Iron Works, Philadelphia.
- 164 Tons, Erie County, N. Y., State highway bridge FSC 6004, to Bethlehem Steel Co., Bethlehem, Pa., through H. F. Stimm, Inc.
- 150 Tons, Millville, N. J., armory for 157th Field Artillery, to American Bridge Co., Pittsburgh.
- 130 Tons, Elizabeth, N. J., community building for St. Adalbert Roman Catholic Church, to American Bridge Co., Pittsburgh.
- 135 Tons, Pittsburgh, mill building for Mackintosh-Hemphill Co., to Pittsburgh Bridge & Iron Co., Pittsburgh.
- 120 Tons, Washington, machine shop extension, to Fort Pitt Bridge Works Co., Pittsburgh.

THE SOUTH

- 470 Tons, Gadsden, Ala., building for Goodrich Tire & Rubber Co., to Ingalls Iron Works Co., Birmingham.
- 400 Tons, Oklahoma and California, bridges for Santa Fe System, to American Bridge Co., Pittsburgh.
- 350 Tons, Montgomery County, Tex., bridges, to Carnegie-Illinois Steel Co., Pittsburgh.
- 300 Tons, Kentucky Dam, Ky., conveyor structures for TVA, to Decatur Iron & Steel Co., Decatur, Ala.
- 250 Tons, Marion County, W. Va., highway bridge, to Riverside Steel Co., Wheeling, W. Va.
- 215 Tons, Kingfisher County, Okla., bridge, to Tulsa Boiler & Machine Co., Tulsa, Okla.
- 170 Tons, Hughes County, Okla., bridge, to Capitol Steel & Iron Co., Oklahoma City.
- 115 Tons, Yukon, Fla., boat house for Navy Department, to Ingalls Iron Works Co., Birmingham.
- 110 Tons, Houston, Tex., Y. M. C. A. building, to Consolidated Steel Corp., Los Angeles.
- 100 Tons, St. Augustine, Fla., San Sebastian River bridge, Florida East Coast Railway, to Virginia Bridge Co., Roanoke, Va.

CENTRAL STATES

- 225 Tons, St. Louis, Gravois Avenue underpass for State, to Mississippi Valley Structural Steel Co., St. Louis.
- 200 Tons, St. Louis, building, to Stupp Brothers Bridge & Iron Co., St. Louis.
- 190 Tons, Cincinnati, truck terminal for American Terminal Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 170 Tons, Cowley County, Kan., bridge, 38-18-FA 565A (1), to St. Joseph Structural Steel Co., St. Joseph, Mo.
- 140 Tons, Morley, Iowa, bridges for Milwaukee Road, to Milwaukee Bridge Co., Milwaukee.
- 130 Tons, Marine City, Mich., Detroit Gasket & Mfg. Co. factory, to Whitehead & Kales Co., Detroit.

WESTERN STATES

- 1600 Tons, San Francisco, bottling building for Acme Breweries, to Herrick Iron Works, Oakland, Cal.
- 1300 Tons, Ogden, Utah, Government depot supply building, Hill Field, to Bethlehem Steel Co., Bethlehem, Pa.
- 359 Tons, Odair, Wash., rails and accessory metalwork for crane tracks for Grand Coulee Dam (Specification 1365-D), to Carnegie-Illinois Steel Corp., Denver, and Bethlehem Steel Co., Chicago.
- 255 Tons, Eagle County, Colo., railroad overpass, to Kansas City Structural Steel Co., Kansas City, Kan.
- 250 Tons, The Dalles, Ore., tandem canal locks, to Schmitt Steel Co., Portland, Ore., through Tavares Construction Co., Stevenson, Wash., contractor.

- 140 Tons, Friant, Cal., embedded metalwork for drum-gate anchorages at Friant Dam (Specification 1358-D), to Philips & Davies, Inc., Kenton, Ohio; American Bridge Co., Denver, and California Steel Products Co., San Francisco.
- 135 Tons, Jefferson County, Colo., highway bridge, to Midwest Steel & Iron Works, Denver.
- 117 Tons, Ignacio, Colo., automatic radial gates for Vallecito Dam (Specification 1353-D), to Philips & Davies, Inc., Kenton, Ohio.
- 110 Tons, Provo River, Utah, Specification 1363-D, for Bureau of Reclamation, to Western Pipe & Steel Co.
- 108 Tons, Friant, Cal., pier plates and erection trusses for Friant Dam (Specification 1362-D), to Stearns-Rogers Mfg. Co., Denver, and International Derrick & Equipment Co., Torrance, Cal.
- 100 Tons, Everett, Wash., plant extension, Soundview Pulp & Paper Co., to Isaacson Iron Works, Seattle.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 5000 Tons, Hartford, Conn., State bridge about a mile outside of city.
- 700 Tons, Stamford, Conn., power house; Stone & Webster Co., contractor.
- 500 Tons, Dundalk, Md., barrel racks for warehouse D, for Frankfort Distilleries.
- 440 Tons, Brooklyn, grade separations, Sheephead Bay, for Triborough Bridge Authority.
- 350 Tons, Bayonne, N. J., E. B. Badger & Son, Boston, manufacturing plant; Stone & Webster Co., Boston, contractor.
- 250 Tons, New York, grade separation, contract H-9, Tremont Avenue, for Triborough Bridge Authority.
- 220 Tons, New Brunswick, N. J., building for Johnson & Johnson.
- 220 Tons, Blair County, Pa., State underpass.
- 120 Tons, Wellington, Conn., State bridge.

THE SOUTH

- 1100 Tons, Jackson, Miss., glass and lamp factory for General Electric Co.
- 450 Tons, State of Kentucky, intake gate rail support towers for TVA.
- 370 Tons, Louisville, Ky., building for Coca-Cola Bottling Co.
- 150 Tons, Jett, Okla., Great Salt Plains Dam; bids taken.

CENTRAL STATES

- 440 Tons, State of Illinois, two highway bridges; bids taken.
- 426 Tons, State of Missouri, three highway bridges; bids July 19.
- 330 Tons, La Crosse, Wis., office and mercantile building for Frank J. Hoeschler.
- 260 Tons, Chicago, factory building for Continental Can Co.
- 200 Tons, Cuyahoga County, Ohio, State grade separation.
- 183 Tons, Cleveland, State bridge No. CU-6-127 at Bulkley, Lake and Clifton Boulevards; bids July 13.

Weekly Bookings of Construction Steel

Week Ended →	July 9, 1940	July 2, 1940	June 11, 1940	July 11, 1939	Year to Date	
					1940	1939
Fabricated structural steel awards	14,500	11,750	17,550	7,950	404,830	518,875
Fabricated plate awards	8,875	1,765	1,345	625	80,130	93,785
Steel sheet piling awards	200	2,190	0	6,810	21,515	39,565
Reinforcing bar awards	8,260	6,800	6,700	6,575	231,810	259,845
Total Letting of Construction Steel	31,835	22,505	25,595	21,960	738,285	912,070

- 120 Tons, Macomb Co., Mich., office and factory building for Gairing Tool Co.
100 Tons, Dayton, Ohio, Deeds carillon tower.

WESTERN STATES

- 2000 Tons, San Francisco, Bank of America building.
400 Tons, Pueblo, Colo., steam plant extension for Southern Colorado Power Co.

FABRICATED PLATES

AWARDS

- 3800 Tons, Baltimore, tanks for War Department to Bethlehem Steel Co., Bethlehem, Pa.
1047 Tons, Los Angeles, Burbank-Santa Monica distribution line, Metropolitan Water District (Specification 333), to United Concrete Pipe Corp., Los Angeles.
1000 Tons, Watts Bar, Tenn., radial gates for TVA, to Dravo Corp., Pittsburgh.
425 Tons, Freeport, Tex., welded pipe, to Wyatt Metal & Boiler Works, Dallas, Tex.
119 Tons, State of Colorado, Bureau of Reclamation (Specification 1353D), to an unnamed bidder.
110 Tons, Lower Penns Neck Township, N. J., water tank, to an unnamed bidder.
100 Tons, State of California, Bureau of Reclamation (Specification 1363D), to Western Pipe & Steel Co., San Francisco.

HAWAII

- 2275 Tons, tanks for War Department, to Graver Tank & Mfg. Co., East Chicago, Ind.

SHEET PILING

AWARDS

- 201 Tons, Woodland, Wash., Lewis River bridge, to Bethlehem Steel Co., Bethlehem, Pa.

Cast Iron Pipe

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., W. S. Byrne, secretary, plans pipe lines for water system in districts Nos. 1608, 1623 and 1624, recently created.

Seattle, Wash., plans 8-in. pipe for extensions in main water line in parts of 16th, 17th, 18th and 19th Avenues. Cost close to \$50,000. C. L. Wartelle, City-County Building, is city engineer.

Huntington Park, Cal., asks bids until July 15 for 10-in. pipe for extension in main water supply line in part of Gage Avenue.

Public Works Officer, Naval Air Station, Pensacola, Fla., plans submarine pipe lines for water supply for local station; also similar pressure lines for gas transmission. Fund of \$50,000 has been arranged for entire project.

Madison, Wis., plans 10-in. pipe for connection between proposed new water tank and distribution system. Tank unit will be steel type on steel tower, about 100,000-gal. capacity. Bids will be asked in about 60 days. Leon A. Smith, City Hall, is superintendent of water system.

Beaumont, Tex., plans extensions and replacements in water pipe lines. Albert C. Moore & Co., Smith-Young Tower Building, San Antonio, Tex., consulting engineers, have been engaged to make surveys and estimates of cost. Same engineers are preparing plans for municipal natural gas distribution system.

Constructing Quartermaster, Fort Myer, Va., has let contract to A. Stanley Mundy & Co., 52 Main Street, Woodbridge, N. J., at \$58,800 for pipe line from Georgetown, D. C., to Arlington Cantonment area, Arlington, Va., for water supply.

Beachwood, N. J., plans pipe line extensions in water system and other waterworks installation, including elevated steel tank and tower. Cost about \$30,000. Financing has been arranged through Federal aid.

Alvord, Tex., has plans for pipe lines for water system and other waterworks installation, including elevated steel tank and tower. Bond issue of \$40,000 has been authorized. Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

Mansfield, Ohio, plans main pipe line from pumping station to connection with section of system serving industrial district. Cost about \$65,000.

Reinforcing Steel

Awards of 8260 tons; 6000 tons in new projects

AWARDS

ATLANTIC STATES

- 370 Tons, Dutchess County, N. Y., State highway project, to Wickwire-Spencer Steel Co., Buffalo, through John Arborio, Inc., Poughkeepsie.
250 Tons, Genesee County, N. Y., State highway project, to Wickwire-Spencer Steel Co., Buffalo.
250 Tons, Luzerne County, Pa., highway project, to Bethlehem Steel Co., Bethlehem, Pa., through Banks Construction Co., Wilkes-Barre, Pa.
225 Tons, Seaford, Del., bridge, to Bethlehem Steel Co., Bethlehem, Pa., through National Building Supply Co., McDermott Construction Co. (previously reported to Taylor-Davis, Inc., in error).
260 Tons, Kingston, Pa., flood control culverts, to Bethlehem Steel Co., Bethlehem, Pa.
180 Tons, Newark, N. J., Passaic River bridge, route 25, section 303C, to Jones & Laughlin Steel Corp., Pittsburgh, through La Fera Grecco Contracting Co.
165 Tons, Lynnfield-Wakefield, Mass., road and bridge, to Northern Steel Co., Boston, C. Bianchi Co., Boston contractor.
160 Tons, Binghamton, N. Y., flood-control project, to Buffalo Steel Co., Buffalo.
160 Tons, Fort Dix, N. J., water filtration plant, to Bethlehem Steel Co., Bethlehem, Pa., through National Building Supply Co.; Karno-Smith Co., contractor.
110 Tons, Schuylkill County, Pa., road project, to Bethlehem Steel Co., Bethlehem, Pa., through D. A. Kessler.
100 Tons, State of Maine, highways, to Bancroft & Martin Rolling Mill Co., Portland, Me.

CENTRAL STATES

- 950 Tons, Massillon, Ohio, Wetmore and Sippo Creek high pressure conduits for U. S. Engineers, to Jones & Laughlin Steel Corp., Pittsburgh, through United Contractors, Grand Rapids, Mich.
600 Tons, Waveland, Ark., outlet works, Blue Mountain dam, to Truscon Steel Co., Youngstown, through John Kerns Construction Co.
434 Tons, State of Missouri, highway project, to Laclede Steel Co., St. Louis.
400 Tons, Chicago, sewer project, to O. J. Dean Co., Chicago.
251 Tons, Chicago, garage, to Concrete Steel Co., New York, through A. J. Anderson Construction Co., Chicago.
230 Tons, Topeka, Kan., Procurement invitation No. 5760, to Sheffield Steel Corp., Kansas City.
175 Tons, Chicago, warehouse, Sears-Roebuck & Co., to Ceco Steel Products Co., Omaha, through En-Jay Construction Co., Chicago.
150 Tons, Minneapolis, building for Standard Grocery Co., to Laclede Steel Co., St. Louis.
110 Tons, Roanoke, Ind., highway project, to Truscon Steel Co., Youngstown.
105 Tons, Fort Wayne, Ind., Coca-Cola building, to Ceco Steel Products Co., Omaha, through Max Irmischer & Sons, Fort Wayne.
100 Tons, Shawnee County, Kan., bridge, to Sheffield Steel Corp., Kansas City.

WESTERN STATES

- 1475 Tons, Odair, Wash., Grand Coulee Dam and pumping plant (Invitations B-38, 311-B, B-38,314-A, B-38,318-B), to Bethlehem Steel Co., San Francisco.
144 Tons, Ignacio, Colo., Pine River project (Invitation 32,205-A), to Colorado Fuel & Iron Corp., Denver.
115 Tons, South Pasadena, Cal., Fair Oaks Avenue and Pacific Electric undercrossings, Arroyo Seco Parkway, to Graham Brothers, Inc., Los Angeles, through Carlo Bongiovanni, Hollywood, Cal., contractor.
107 Tons, Los Angeles, underpass, Arroyo Seco Parkway between Avenue 26 and San Fernando Road, to Blue Diamond Corp., Los Angeles, through J. E. Had-dock, Ltd., Pasadena, Cal., contractor.
100 Tons, Bonita, Cal., highway bridge, to Soule Steel Co., Los Angeles, through Oberg Brothers, Los Angeles, contractors.

CANAL ZONE

- 235 Tons, Coco Solo, miscellaneous buildings, to Truscon Steel Co., Youngstown, through McDonald Construction Co.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 800 Tons, Hartford, Conn., part of flood control program involving 7000 tons of bars.
300 Tons, Chicopee, Mass., viaduct, highways and culverts, to various contractors.
200 Tons, Pawtucket, R. I., housing project.
100 Tons, South Windsor, Conn., highway and bridge; Savin Construction Co., Hartford, contractor.
100 Tons, Chicopee, Mass., five hangars.

CENTRAL STATES

- 1688 Tons, or 1456 Tons, Savanna, Ill., 44 ammunition magazines, 912 tons. In addition either 63 magazines totaling 544 tons, or 85 magazines totaling 726 tons. Choice of alternate decides total tonnage; bids in.
400 Tons, La Crosse, Wis., office building.
380 Tons, St. Paul, Minnesota Mining Co.
219 Tons, Cuyahoga County, Ohio, grade elimination and bridge.
150 Tons, Chicago, building for Northwestern Life Insurance Co.
140 Tons, Chicago, Von Lengerke & Antoine building; bids in.
130 Tons, Chicago, section S-6A, Chicago subway; bids July 11.
130 Tons, Cleveland, State bridge No. CU-6-135 at Bulkley, Lake and Clifton Boulevards; bids July 13.
160 Tons, Cleveland, State bridge No. CU-6-127 at Bulkley, Lake and Clifton Boulevards; bids July 13.

WESTERN STATES

- 1000 Tons, Fort Peck, Mont., power house for U. S. Engineer; bids July 17.
285 Tons, Rutledge, Tex., Marshall Ford Dam, readvertisement (Invitation A-46, 908-A-1); bids in.
175 Tons, Mesa, Ariz., underpass; bids July 12.
153 Tons, Zillah, Wash., Yakima project (Invitation A-33, 592-A); bids in.

Pipe Lines

Memphis Natural Gas Co., Memphis, Tenn., Birger L. Johnson, president, plans extensions in welded steel pipe line from Monroe, La., gas field to Memphis, for natural gas transmission. Lateral and loop lines will be installed. Capacity of system will be increased to handle about 80,000,000 cu. ft. of gas daily, with installation of new 1000-hp. compressor station for booster service, control plant and other operating facilities. Cost over \$1,000,000.

Center, Tex., has plans for 2 to 6-in. steel pipe line system for municipal natural gas distribution, including main welded steel pipe line for connection with supply source. Booster station, meter and control house, and other operating facilities will be installed. Financing has been arranged. Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

Constructing Quartermaster, Tampa, Fla., asks bids until July 18 for pipe lines for oil dispensing system, with oil storage tanks and facilities at local MacDill Field (Circular 6899-107).

New York State Gas & Electric Co., Binghamton, N. Y., has approved plans for extensions in pressure pipe line system for gas distribution in various streets. Cost over \$65,000.

Peoples' Gas & Water Co., Meridian, Miss., has approved plans for extensions in pressure pipe line systems for natural gas distribution at Meridian and Columbus, Miss., including new line to plant of Flintkote Co., near Meridian municipal airport, now in course of erection, where gas service will be furnished; also pipe lines for gas supply for new Federal housing projects. A new high-pressure main pipe line for loop service will be installed at Meridian, as well as new compressor station and other operating facilities. Cost about \$150,000. Proposed to use 6 and 4-in. pressure pipe.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., W. S. Byrne, secretary, plans pressure pipe lines for gas distribution in districts Nos. 885 and 888, recently created.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes ²	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Wor	cester =	3.00¢)			2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Wor	cester =	3.35¢)			3.05¢		
TIN PLATE															
Standard cokes (Per 100-lb. base box)	\$5.00	\$5.00	\$5.00						\$5.10						
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG															
Special coated (Per base box)	\$4.30		\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Du	luth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.40¢	2.47¢
Rail steel ⁶	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢					2.40¢	2.70¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.25¢	2.30¢	2.25¢		
Reinforcing (rail) ⁷	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.15¢	2.20¢	2.15¢		
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							3.70¢		
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Coatesville and Claymont = 2.10¢)		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Wor	cester =	3.00¢)					
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Wor	cester =	4.50¢)					
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Wor	cester =	6.35¢)					
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Wor	cester =	8.55¢)					
WIRE⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢										
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢										
Spring	3.20¢	3.20¢		3.20¢	3.20¢										
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢					2.85¢	2.95¢			
IRON BARS															
Common		2.25¢			(Terra	Haute, Ind. =	2.15¢)								
Refined	3.75¢														
Wrought	4.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to 29 gage within certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lots to manufacturing trade. ¹⁰ Boxed.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling\$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

Per Gross Ton
3 in. to 8 in.\$54.00
8 in. to 12 in. 52.00
12 in. to 18 in. 54.00
18 in. and over. 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the making of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer.\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared. 1.90c.

Wire Rods

(No. 5 to 9/32 in.) *Per Lb.*
Pittsburgh, Chicago, Cleveland 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.

9/32 in. to 47/64 in., \$3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C...	\$6.00	\$12.00
15-lb. coating I.C...	7.00	14.00
20-lb. coating I.C...	7.50	15.00
25-lb. coating I.C...	8.00	16.00
30-lb. coating I.C...	8.63	17.25
40-lb. coating I.C...	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg
Standard wire nails\$2.55
Coated nails 2.55
Cut nails, carloads 3.85

Base per 100 Lb.
Annealed fence wire\$3.05

Base Column
Woven wire fence* 67
Fence posts (carloads) 69
Single loop bale ties 56
Galvanized barbed wire† 70
Twisted barbless wire 70

*15½ gage and heavier. †On 80-rod spools in carload quantities.
Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List
Machine and carriage bolts:
½ in. and 6 in. and smaller....68½
Larger and longer up to 1 in....66
1½ in. and larger.....64
Lag bolts66

Plow bolts, Nos. 1, 2, 3, and 7....68½
Hot pressed nuts; c.p.c., t-nuts;
square, hex., blank or tapped:
½ in. and smaller.....67
9/16 in. to 1 in. inclusive.....64
1½ in. to 1½ in. inclusive.....62
1½ in. and larger.....60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller.....	67	70
9/16 to 1 in.....	64	65
1½ in. through 1½ in..	62	62
1½ in. and larger.....	60	60

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 72½

Stove bolts in packages, with nuts attached, add 15% extra.

Stove bolts in bulk.....83½

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham\$3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham65 and 10

Cap and Set Screws

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller....50 and 10

Milled headless set screws, cut thread ¼ in. and larger.... 64

3/16 in. and smaller..... 73

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller 70

Upset set screws, cup and oval points 75

Milled studs 52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	July 3	July 5	July 6	July 8	July 9
Copper, Electrolytic¹	11.50	11.50	11.50	11.50	11.50
Copper, Lake	11.50	11.50	11.50	11.50	11.50
Tin, Straits, New York	52.00	52.00	....	52.00	51.25
Zinc, East St. Louis²	6.25	6.25	6.25	6.25	6.25
Lead, St. Louis³	4.85	4.85	4.85	4.85	4.85

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	53.00	56.50
Copper		
Lake	13.25	12.625
Electro	12.75	12.625
Castings	12.375	12.375
H. R. sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow, sheets*	18.56	18.56
Yellow, rods*	13.55	13.55
Seamless tubes*	21.31	21.31
Zinc		
Slabs	7.60	7.75
Sheets, No. 9 casks..	12.00	12.00
Lead		
American pig	6.10	5.50
Bar	8.05	8.25
Cut sheets.....	8.25	8.25

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible..	8.875	9.50
Hvy. and wire...	7.875	8.25
Light and bottoms	6.875	7.375
Brass		
Heavy	4.875	5.375
Light	3.375	4.625
No. 1 yel. turn...	4.50	5.50
No. 1 red or compo. turn	7.625	8.125
Hvy. mach. compo.	7.875	8.50
Lead		
Heavy	4.00	4.375
Aluminum		
Cast	8.50	9.50
Sheet	14.00	15.00
Zinc	3.25	4.00

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 19c.-20c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$200 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 12c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 3¾%; on brass sheets and rods, 40; on brass tubes, 3¾%, and copper tubes, 40.

PRICES

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....\$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade 2.70c.
Delivered, Detroit 2.80c.

S.A.E.

Series

Numbers

2000 (1.5 Ni)

Alloy
Differential,
per 100 Lb.

2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.55
2500 (5 Ni)	2.25
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)..	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)..	0.75
x4340 Cr-Ni-Mo	1.65
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.10
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)....	2.60
6100 Cr-V bar	1.20

6100 Cr-V spring steel	0.85
Cr-Ni-V	1.50
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars ..	18.50c.	19.00c.	22.50c.	27.50c.
Plates ..	21.50c.	22.00c.	25.50c.	30.50c.
Sheets ..	26.50c.	29.00c.	32.50c.	36.50c.
H't strip	17.00c.	17.50c.	24.00c.	35.00c.
C'd st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed .....	.67c.
High-carbon-chromium .....	.43c.
Oil-hardening .....	.24c.
Special .....	.22c.
Extra .....	.18c.
Regular .....	.14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago ..	\$54.80
6-in. and larger, del'd New York ..	52.20
6-in. and larger, Birmingham ..	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

MEMO

TO MANUFACTURERS OF LIGHT GAUGE METALS:



PITTSBURGH Plate Glass Company's Spiral Wound Brushes have reduced finishing costs for many manufacturers of light gauge steel and tin plate. Why not consult with our technically trained representatives? They will gladly work with you in developing Spiral Wound Brushes, of wire, horseshair or tampico, to meet your particular finishing requirements.

Write or telephone today.

PITTSBURGH BRUSH DIVISION
PLATE GLASS COMPANY BALTIMORE, MD.

PRICES

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d. 13 B.W.G.	\$9.01	\$7.82	....
1 1/4 in. o.d. 13 B.W.G.	10.67	9.26	....
1 1/2 in. o.d. 13 B.W.G.	11.70	10.23	\$9.72
1 3/4 in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2 1/4 in. o.d. 13 B.W.G.	16.76	14.54	13.79
2 1/2 in. o.d. 12 B.W.G.	18.45	16.01	15.16
2 3/4 in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 1/2 in. o.d. 11 B.W.G.	22.48	19.50	18.35
4 in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 1/2 in. o.d. 10 B.W.G.	35.20	30.54	28.66
5 in. o.d. 9 B.W.G.	43.04	37.35	35.22
5 1/2 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price=\$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
1/8 in.	56	36
1/4 to 3/8 in.	59	43 1/2
1/2 in.	63 1/2	54
3/4 in.	66 1/2	58
1 to 3 in.	68 1/2	60 1/2

Wrought Iron

	Black	Galv.
1/4 and 3/8 in.	+9	+30
1/2 in.	24	6 1/2
3/4 in.	30	13
1 and 1 1/4 in.	34	19
1 1/2 in.	38	21 1/2
2 in.	37 1/2	21

Lap Weld

Steel	Black	Galv.
2 in.	61	52 1/2
2 1/2 and 3 in.	64	55 1/2
3 1/2 to 6 in.	66	57 1/4
7 and 8 in.	65	55 1/2
9 and 10 in.	64 1/2	55
11 and 12 in.	63 1/2	54

Wrought Iron

	Black	Galv.
2 in.	30 1/2	15
2 1/2 to 3 1/2 in.	31 1/2	17 1/2
4 in.	33 1/2	21
4 1/2 to 8 in.	32 1/2	20
9 to 12 in.	28 1/2	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
1/8 in.	54 1/2	41 1/2
1/4 to 3/8 in.	56 1/2	45 1/2
1/2 in.	61 1/2	53 1/2
3/4 in.	65 1/2	57 1/2
1 to 3 in.	67	60

Wrought Iron

	Black	Galv.
1/4 and 3/8 in.	+10	+43
1/2 in.	25	9
3/4 in.	31	15
1 to 2 in.	38	22 1/2

Lap weld, extra strong, plain ends

Steel	Black	Galv.
2 in.	59	51 1/2
2 1/2 and 3 in.	63	55 1/2
3 1/2 to 6 in.	66 1/2	59

	Black	Galv.
7 and 8 in.	65 1/2	56
9 and 10 in.	64 1/2	55
11 and 12 in.	63 1/2	54

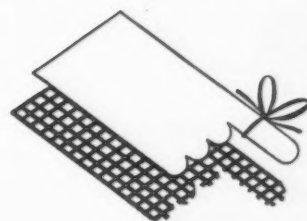
Wrought Iron

	Black	Galv.
2 in.	33 1/2	18 1/2
2 1/2 to 4 in.	39 1/2	25 1/2
4 1/2 to 6 in.	37 1/2	24
7 and 8 in.	38 1/2	24 1/2
9 to 12 in.	32	20 1/2

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

WHEN THE Seller forgets Buyers Beware OF FORGINGS



AND sellers of forgings do sometimes forget, unintentionally, of course, to include all the materials, equipment, and operations essential for fabricating and finishing forgings. When this occurs, somehow, somewhere, the seller of forgings has got to recover any loss, and from there on strive to make a profit. Over-working worn-out dies, speeding up the heating and forging operations, means excess metal to cut off, slows up finishing operations, and utterly defeats the possibility of realizing lower costs at the point of assembly. Beware of quotations that are obviously out of line. Check all others for the source that assures lowest cost at the point of assembly. Experienced buyers of T & W forgings confidently expect lower costs at the point of assembly. Consult a T & W forging engineer about T & W safeguards against excessive costs.



[For those manufacturers having their own forging equipment, T & W will gladly quote on die requirements.]

TRANSUE & WILLIAMS
STEEL FORGING CORPORATION
ALLIANCE, OHIO

Sales Offices: New York, Philadelphia, Chicago, Indianapolis, Detroit and Cleveland

PRICES

ORES

Lake Superior Ores

Delivered Lower Lake Ports
Per Gross Ton

Old range, bessemer, 51.50%...	\$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%....	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%.....	4.35

Foreign Ores*

C.A.J. Philadelphia or Baltimore, Exclusive of Duty

Algerian, low P, Cu free, dry, 55 to 58% Fe.....	Nom.
Caucasian, washed, 52% Mn....	Nom.
African, Indian, 44 to 48% Mn..	Nom.

African, Indian, 49 to 51% Mn..Nom.
Brazilian, 46 to 48% Mn..... 52c.
Cuban, del'd, duty free, 51% Mn. 72c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....	\$23.50
Tungsten, domestic scheelite, delivered	23.50
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)...	Nom.
Rhodesian, 45%	\$24.00
Rhodesian, 48%	28.50

*All foreign ore prices are nominal. War conditions have prevented trading in Swedish and Turkish ores and all quotations have therefore been withdrawn.

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	\$40.00
Angle bars, 100 lb.....	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	\$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast.....	2.30c.
Track bolts, steam railroads...	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)...	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail.....	\$20.00
Domestic, f.o.b. Ohio River landing barges	20.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..	\$20.50 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid....	\$25.00 to \$25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....	\$31.00
As above, in bags, f.o.b. same mines	\$32.60

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick, at St. Louis..	\$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey.....	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois.....	42.75
Second quality, New Jersey....	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton.....	7.10

Silica Brick

Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester...	\$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

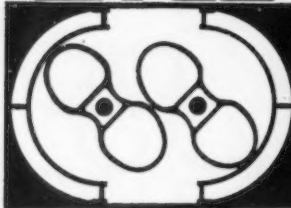
Standard f.o.b. Baltimore and Chester	\$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	\$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

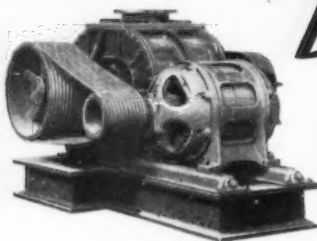
*None available.

SAFEGUARDS



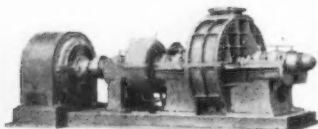
for OPERATING PROFITS

Blowers



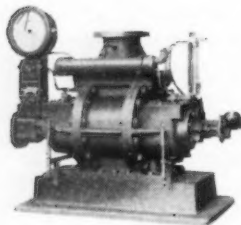
Roots-Connorsville Blowers are good protection against loss of productive time. Simple, ruggedly built, always dependable, they deliver air at needed pressures with a minimum power demand. Capacities 5 to 50,000 CFM, pressures to 15 lbs.

Gas Boosters



For reliable furnace operation make sure of adequate gas pressure. Back of every "R-C" Gas Booster are years of experience building gas handling equipment. Both Rotary Positive and Centrifugal types arranged for any convenient power—steam, electric or gas engine.

Meters



The Connorsville Rotary Displacement Meter gives you accurate measurement of gas used or produced. Simple, direct reading dial or recorded on charts. Accuracy undisturbed by variations in rate of flow or kind of gas handled. No delicate parts to wear, no adjustments to make.

Roots CONNERSVILLE

BLOWER CORPORATION

407 Ohio Ave.

Connorsville, Ind.

NEW YORK • CHICAGO • POTTSTOWN, PA. • SAN FRANCISCO
PITTSBURGH • BOSTON • DETROIT • ST. LOUIS • LOS ANGELES

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton
Domestic, 80% (carload).....\$120.00

Spiegeleisen

Per Gross Ton Furnace
Domestic, 19 to 21%.....\$36.00
Domestic, 26 to 28%.....49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size
50% (carload lots, bulk).....\$74.50*
50% (ton lots, packed).....87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio
10.00 to 10.50%.....\$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio
5.00 to 5.50%.....\$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon17.50c.
1% carbon18.50c.
0.10% carbon20.50c.
0.06% carbon21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon\$113.00*
2.50% carbon118.00*
2% carbon123.00*
1% carbon133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... \$2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V., del'd \$2.70 to \$2.90†
Ferracolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots \$2.25†
Ferrocobaltitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....\$142.50

*Spot prices are \$5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

Ferrocobaltitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....\$157.50

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton \$58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville \$75.00

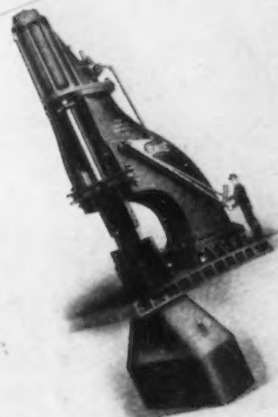
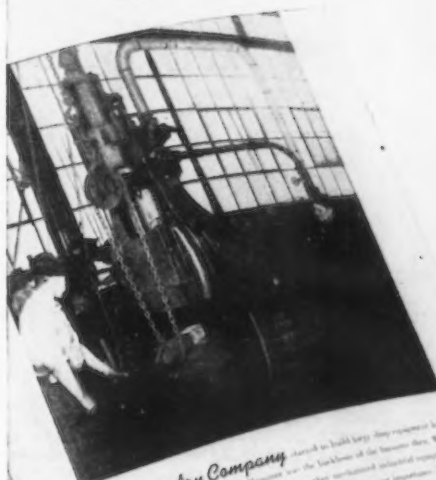
Ferromolybdenum, per lb. Mo, f.o.b. furnace..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

Per Gal.
No. 3, f.o.b. Bayonne, N. J.....4.75c.
No. 6, f.o.b. Bayonne, N. J.....3.21c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland.5.25c.
No. 4 industrial, del'd Cleveland.5.00c.
No. 5 industrial, del'd Cleveland.3.75c.
No. 6 industrial, del'd Cleveland.3.25c.

ERIE SINGLE FRAME FORGING HAMMERS

BULLETIN
335



Erie Foundry Company started to build large drop hammers back in the '30's. The Single Frame Forging Hammer was the backbone of the business then. With the development of drop hammers to improve dies and other mechanical equipment, the manufacture of drop hammers has been the mainstay of Erie Foundry Company. Today, the largest hammers built are the Steam Drop Hammers built by Erie Foundry Company and the customers to build in the field by applying to the Single Frame Forging Hammer, the drop hammers for more severe drop forging conditions of today's manufacture. Improved design, construction and materials characterize the modern Erie machines described on the following pages.

*Clip the Coupon
for your Copy*

THIS new bulletin gives you an accurate picture of the ruggedness which 40 years of engineering experience have enabled Erie to build into Erie Single Frame Forging Hammers . . . Better Design . . . Sturdier Construction . . . greater value to you when you specify Erie Hammers.



ERIE FOUNDRY COMPANY
Erie, Pa., U. S. A.

Gentlemen:
Please send me without obligation your Bulletin No. 335.

Name _____

Address _____

City _____ State _____

ERIE BUILDS Dependable HAMMERS

PRICES

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt	\$4.25 to \$4.50
Foundry, f.o.b. Connellsville, prompt	\$5.25 to 5.50
F'dry, by-product, Chicago....	10.50
F'dry, by-product, New England	12.50
Foundry, by-product, Newark or Jersey City	\$11.30 to \$11.90
F'dry, by-product, Philadelphia	11.13
F'dry, by-product, Cleveland...	11.05
F'dry, by-product, Cincinnati...	10.50
Foundry, Birmingham	7.50
F'dry, by-product, St. Louis	\$10.75 to \$11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....	\$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export.	£17 18s.
Tin plate, per base box 32s. to 33s.	
Steel bars, open hearth	£13 9s.
Beams, open hearth....	£12 2s. 6d.
Channels, open hearth..	£12 2s. 6d.
Angles, open hearth....	£12 2s. 6d.
Black sheets, No. 24 gage	£18 17s. 6d. max.*; £18 17s. 6d. min.**
Galvanized sheets, No. 24 gage	£19 10s. max.*; £19 10s. min.**

*Empire markets only.

**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston.....	\$24.50	\$24.00	\$25.50	\$25.00	.....
Brooklyn.....	26.50	.....	.....	27.00	.....
Jersey City.....	25.53	25.03	26.53	26.03	.....
Philadelphia.....	24.84	24.34	25.84	25.34	.....
Bethlehem, Pa.....	\$24.00	\$23.50	\$25.00	\$24.50	.....
Everett, Mass.....	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.....	24.00	23.50	25.00	24.50	.....
Steeltown, Pa.....	.....	23.50	.....	.....	28.50
Birdsboro, Pa.....	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md...	24.00	23.50	.....	.....	.....
Erie, Pa.....	23.00	22.50	24.00	23.50	.....
Neville Island, Pa....	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.....	23.00	22.50	23.50	23.00	.....
Buffalo.....	23.00	22.00	24.00	23.50	28.50
Cincinnati.....	23.44	23.61	.....	24.11	.....
Canton, Ohio.....	24.39	23.89	24.89	24.39	.....
Mansfield, Ohio.....	24.94	24.44	25.44	24.94	.....
St. Louis.....	23.50	23.02	.....	.....	.....
Chicago.....	23.00	22.50	23.50	23.00	.....
Granite City, Ill.....	23.00	22.50	23.50	23.00	.....
Cleveland.....	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio.....	23.00	22.50	.....	23.00	.....
Toledo.....	23.00	22.50	23.50	23.00	.....
Youngstown.....	23.00	22.50	23.50	23.00	.....
Detroit.....	23.00	22.50	23.50	23.00	.....
St. Paul.....	25.63	.....	26.13	25.63	.....
Duluth.....	23.50	.....	24.00	23.50	.....
Birmingham.....	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle....	27.50	.....	.....	.....	.....
Provo, Utah.....	22.00	.....	.....	.....	.....
Montreal†.....	27.50	27.50	.....	28.00	.....
Toronto†.....	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....\$22.50

CHARCOAL

Lake Superior fce.....\$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

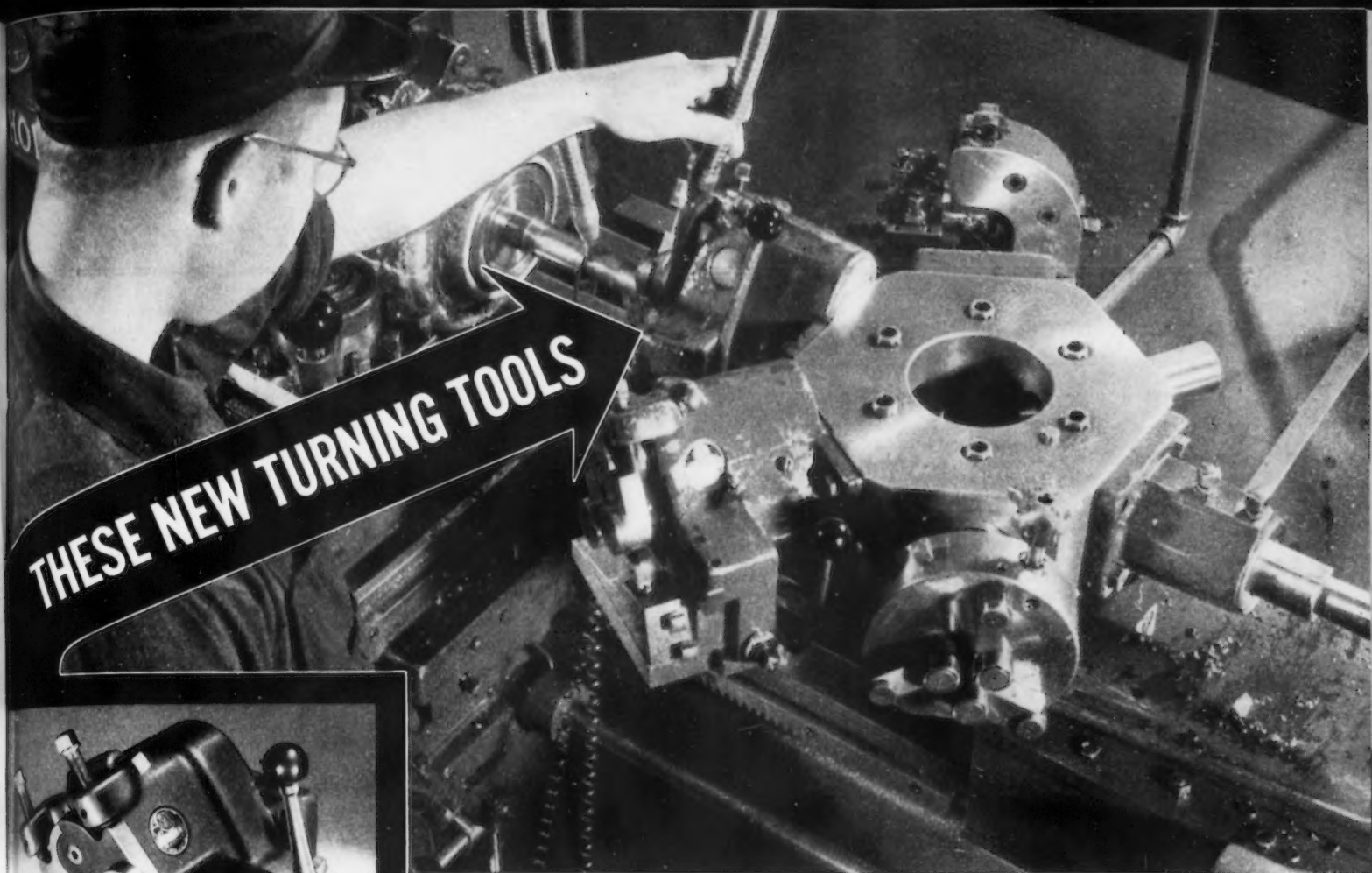
*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

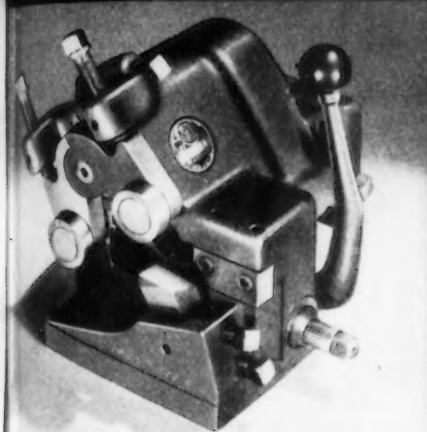
(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pitts- burgh	Chicago	Cleve- land	Phila- delphia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los Angeles
Sheets, hot rolled	\$3.15	\$3.05	\$3.15	\$3.35	\$3.38	\$3.23	\$3.05	\$3.51	\$3.45	\$3.18	\$3.30	\$3.48	\$4.10
Sheets, cold rolled.....	.....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	.....	4.12	4.35	4.43	6.30
Sheets, galvanized.....	4.75	4.60	4.42	4.50	4.30	4.64	4.45	4.66	4.75	4.95	5.00	4.98	5.25
Strip, hot rolled.....	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	.....
Strip, cold rolled.....	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	.....	3.41	3.63	3.54	.....
Plates.....	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes.....	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled.....	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished.....	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	.....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300.	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	.....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100.	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	9.80

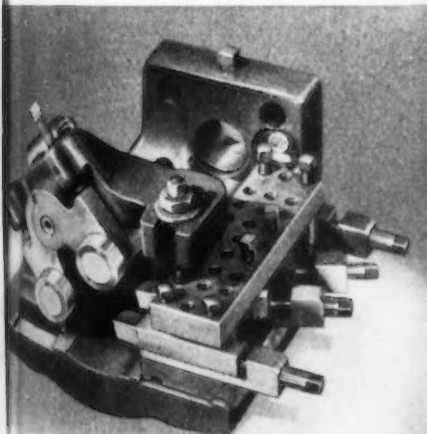
BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1600 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.23.



THESE NEW TURNING TOOLS



GISHOLT SINGLE CUTTER BAR TURNER—fully equipped to protect working parts against damage by chips and dirt.



GISHOLT MULTIPLE CUTTER BAR TURNER—for turning two, three, four or more diameters at the same time.

... For Faster, More Profitable Bar Work!

Surprising how improvements like these can make such a big difference in speeding up your work and cutting your costs! Fur-

thermore, on bar work these new cutter turners machine to even closer tolerances and give finer finishes.

Gisholt Single and Multiple Cutter Turners

Among the design features of these tools which contribute to their ability to make heavy high-speed cuts and still maintain exact dimensions and fine finish are rigid steel construction, hardened steel rollers

mounted on roller bearings, and adjustable roller arms that attach securely to the block. These can be set to lead or follow the work. Set-up operations are facilitated by the micrometer adjustment screws on the tool blocks.



These catalogs cover Gisholt Standard Tools for use on Nos. 3, 4 and 5 Ram Type Universal Turret Lathes, and 1L, 2L and 3L High Production Turret Lathes. Write for your copy, specifying for which machine.

Why postpone the savings you can enjoy with these new Gisholt Single and Multiple Cutter Turners? Order them now through your nearest Gisholt representative or write us direct.

"YOUR SMARTEST INVESTMENT TODAY—BETTER MACHINE TOOLS"



GISHOLT

MACHINE COMPANY

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TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

Sales Possibilities

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic

• **Electric Boat Co.**, 40 Wall Street, New York, submarines, plans expansion at Groton, Conn., shipyard to double present capacity, including four additional shipways, structural shops, machine and metal-working shops and other structures, equipped with electric traveling cranes, hoists and other mechanical-handling facilities. Work is scheduled to begin soon, to provide for early construction of additional submarines for Government, for which contract has been secured. Cost over \$3,500,000 with equipment, with fund to be provided in part by Government.

• **Brewster Aeronautical Corp.**, 34-01 Thirty-eighth Avenue, Long Island City, airplanes and parts, aircraft floats, has leased local plant of Ford Motor Co., heretofore used for assembling operations, totaling about 482,000 sq. ft. of floor space, for expansion.

• **General Electric Co.**, Schenectady, N. Y., has let general contract to Heller-Murray Co., West Rayen Street, Youngstown, for one-story plant at Andover, Ohio, 35 x 120 ft., to be operated in conjunction with branch plant at Cleveland. Cost over \$50,000 with equipment.

• **Bureau of Yards and Docks**, Navy Department, Washington, has appropriation of about \$8,000,000 for expansion and improvements at New York Navy Yard, during fiscal year, including new storehouse with accessory buildings and equipment, \$2,000,000; additions to present storehouse and equipment, \$2,000,000; extensions and improvements in shipway No. 1, \$1,500,000; extensions and improvements in machine and mechanical shops, \$1,000,000 with equipment; additional facilities for fabrication of armored decks, \$275,000; extensions and improvements in power plant, \$750,000; new fitting-out crane on pier G, \$125,000; improvements and additions in crane facilities, \$65,000; extensions and improvements in steel storage runways, \$200,000; new sub-assembly shop with equipment, \$820,000; and other work.

• **Refrigerate Equipment Corp.**, 38 West Sixty-second Street, New York, refrigeration counters, store equipment, etc., has leased one-story building at 43-05 Vernon Boulevard, Long Island City, for plant.

• **Trojan Scrap Iron Corp.**, Front and Division Streets, Troy, N. Y., plans new one-story plant, 70 x 300 ft., with crane runway and other mechanical-handling and loading facilities. Cost over \$50,000 with equipment.

• **International Fireproof Door Co., Inc.**, 137 Bayard Street, Brooklyn, metal frames, doors, sash, etc., has leased one-story building at 157-59 Walworth Street for expansion.

• **Commanding Officer**, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until July 17 for one 30-ton overhead, electric traveling bridge crane, span approximately 70 ft., and lift 60 ft., including main hoist and 5-ton auxiliary hoist (Schedule 764); until July 18, double-girder, inner running, 5-ton electric underhung crane, including wearing strips (tracks) and accessories (Schedule 766).

• **Conti Products Corp.**, 155 Varick Street, New York, soaps, washing powders, etc., has acquired three-story building, about 100 x 100 ft., at 43-53 Clinton Avenue, Brooklyn, and will remodel for plant. Present works in Greenpoint section will be removed to new location and capacity increased.

• **International Aircraft Trading Co., Inc.**, 122 East Forty-second Street, New York, plans one-story plant on waterfront at Bayonne, N. J., for parts production and assembling. Cost over \$65,000 with equipment.

• **Conmar Products Corp.**, 717 Avenue A, Bayonne, N. J., metal slide fasteners, etc., has purchased plant of L. E. Waterman Co., 140-70 Thomas Street, Newark, fountain pens, etc., consisting of main four-story structure and one-story adjoining building, totaling about 250,000 sq. ft. of floor space, for new plant

in about six months, when present works will be removed to new location and increased capacity carried out. Part of building will be used by Margon Corp., toys, doll heads, etc., an affiliated interest, now at same address at Bayonne. Waterman company will erect or purchase another plant in Newark.

• **Commanding Officer**, Ordnance Department, Frankford Arsenal, Bridesburg, Philadelphia, asks bids until July 19 for telescope mounts, quadrant mounts and spare parts (Circular 2226).

• **Leeds & Northrup Co.**, 4901 Stenton Avenue, Philadelphia, electric measuring instruments, parts and other precision equipment, has let general contract to Arnold Bowen, 1110 Edgewood Road, Brookline, Philadelphia, for one-story addition. Cost over \$50,000 with equipment. Richard Erskine, 1718 Cherry Street, is architect.

New England

• **Holo-Krome Screw Corp.**, Brook Street, Elmwood, Hartford, Conn., set screws, wrench sets, socket wrenches, etc., has let general contract to R. G. Bent Co., 93 Edwards Street, for one-story addition, 85 x 200 ft. Cost close to \$100,000 with equipment.

• **Bureau of Yards and Docks**, Navy Department, Washington, has secured appropriation of about \$1,200,000 for expansion and improvements in Boston Navy Yard during fiscal year, to include new fitting-out crane, about \$75,000, extensions and improvements in power plant and electrical distributing system, \$830,000; additional weight-handling equipment, \$220,000; one-story heavy material storage building, \$90,000; one-story extension in present steel storage building, \$50,000, and other work.

• **United States Engineer Office**, Providence, R. I., asks bids until July 25 for three 30-in. pumping units, with discharge piping, gate valves and flap valves; three four-cycle, heavy-duty, stationary-type internal combustion engines for driving pumping units, with silencers, exhaust piping, etc.; and three right-angle gear units for connecting pumps and engines, for Dwight pumping station, Chicopee River, Chicopee, Mass.

Washington District

• **Frankfort Distilleries, Inc.**, Race and Ostend Streets, Baltimore, has asked bids on general contract for eight-story addition for storage and distribution. Cost over \$125,000 with equipment. Main offices are in Columbia Building, Louisville.

• **General Purchasing Officer**, Panama Canal, Washington, asks bids until July 16 for 10,000 ft. of weldless chain, expansion anchors, foot bolts, flush bolts, barrel bolts, handrail brackets, steel-wire brushes, gate hooks and eyes, truck casters and other equipment (Schedule 4139), lead pipe, brass floor drains, etc. (Schedule 4145).

• **Public Works Officer**, Quantico, Va., will secure appropriation of about \$1,000,000 for expansion at local flying field during fiscal year, including shops, hangars and other buildings, aviation shore facilities and other structures.

• **Joseph E. Lewis & Co., Inc.**, 1218 Warner Street, Baltimore, pipe and pipe coils, etc., has let general contract to Kiron Construction Co., 339 St. Paul Place, for one-story addition. Cost about \$40,000 with equipment.

• **Constructing Quartermaster**, Langley Field, Langley, Va., asks bids until July 19 for stability wind tunnel and aviation laboratory at local field.

• **Bureau of Yards and Docks**, Navy Department, Washington, has appropriation of about \$10,000,000 for expansion and improvements at Norfolk Navy Yard, Portsmouth, Va., during fiscal year, to include addition to ma-

chine shop and equipment, \$900,000; one-story addition to steel plate storage yard, \$40,000; new shipway and structures, with cranes and other mechanical-handling facilities, \$8,500,000; extensions and improvements in water supply system, \$150,000; additional shipway cranes and improvements in present shop cranes, \$140,000; weight-handling and transportation equipment, \$175,000; extension and improvements in power distribution and lighting system in shops, \$70,000, and other work.

Buffalo District

• **Kimberly-Clark Corp.**, Packard Road, Niagara Falls, N. Y., book and other paper stocks, plans one-story addition to mill. Cost over \$60,000 with equipment. Main offices are at Neenah, Wis.

• **Bausch & Lomb Optical Co.**, 635 St. Paul Street, Rochester, N. Y., precision instruments and equipment, is arranging to take over building occupied by Edison Technical and Industrial High School, 157 Martin Street, and will convert structure for plant expansion.

• **Swanson Machine Co.**, 59 Hopkins Avenue, Jamestown, N. Y., machinery and parts, will remodel and improve former plant of Spicer Mfg. Co., Falconer, N. Y., recently acquired for expansion. Several separate contracts are being awarded, and work will begin at once. Cost over \$50,000 with equipment.

South Atlantic

• **Babcock Aircraft Corp.**, Conrad Building, Deland, Fla., operating in building recently secured under lease, has plans for new plant near municipal airport, consisting of main one-story unit, 80 x 260 ft., and smaller one-story buildings for shops, engineering department, administration and other departments. Cost over \$90,000 with equipment. Bids will be asked soon, with work to begin early in fall. Allen L. Bryant, Orlando, is vice-president, and V. C. Babcock, vice-president in charge of engineering; Fred L. Foster, Akron, Ohio, is president.

• **Constructing Quartermaster**, MacDill Field, Tampa, Fla., asks bids until July 19 for one 500,000-gal. elevated steel tank, with piping and accessories, for local field (Circular 6899-2).

Western Pa. District

• **Johnson Bronze Co.**, South Mill Street, New Castle, Pa., bronze bushings, bearings, etc., has approved plans for one-story addition, for which superstructure will begin soon. Cost close to \$75,000 with equipment.

• **United States Engineer Office**, New Post Office Building, Pittsburgh, asks bids until July 24 for two 370-gal. steel oil tanks, with all parts, for Mahoning and Loyalhanna dams, respectively (Circular 761); one 20-gal. hydraulic accumulator, with bolts, anchors, ballast and parts, for Mahoning dam, near Dayton, Pa., and one 10-gal. similar accumulator, for Loyalhanna dam, near Saltsburg, Pa. (Circular 762).

• **American Viscose Co.**, Delaware Trust Building, Wilmington, Del., viscose rayon products, plans expansion and improvements in branch mill at Meadville, Pa., including one-story addition. Cost over \$75,000 with equipment.

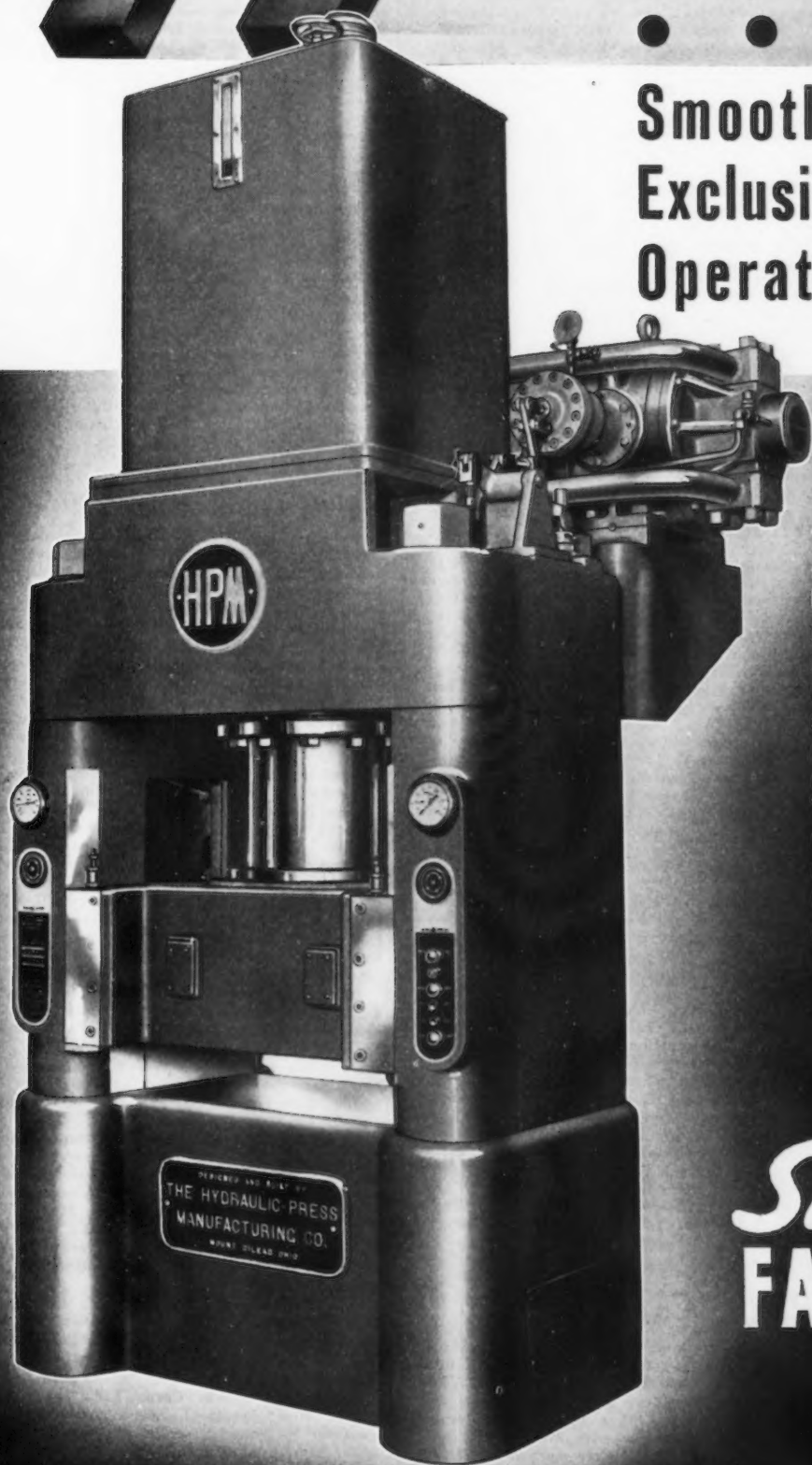
Michigan District

• **H. & H. Tube & Mfg. Co.**, 261 Scotten Street, Detroit, metal tubing, etc., has let general contract to Carl R. Joelson, 20215 Gilman Street, for one-story addition. Cost close to \$50,000 with equipment.

• **Dow Chemical Co.**, Midland, Mich., has let

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general contract to Austin Co., Cleveland, for one-story addition to Dowmetal plant at Bay City, Mich., 80 x 200 ft., for increased capacity in core-making and molding departments for magnesium alloys. Cost about \$100,000 with equipment.

Lahey Foundry & Machine Co., Muskegon, Mich., motor castings and allied products, plans rebuilding part of main plant recently destroyed by fire. Loss close to \$100,000 with equipment.

Ohio and Indiana

• **Boehm Pressed Steel Co.**, 2219 West Sixty-third Street, Cleveland, stampings, dies, etc., has let general contract to Boldt-Rapp Co., 2175 Ashland Road, for two one-story additions, 50 x 170 ft., and 35 x 37 ft., for expansion in machine shop, and for storage and distribution, respectively. Cost over \$60,000 with equipment.

Wheelock, Lovejoy & Co., Inc., 5205 Hamilton Avenue, Cleveland, iron and steel products, plans new one-story storage and distributing plant, about 22,000 sq. ft. of floor space. Cost over \$45,000 with mechanical-handling equipment and other facilities.

Taylor Aviation Corp., Alliance, Ohio, airplanes and parts, has engaged Albert Kahn, Inc., New Center Building, Detroit, to prepare plans for one-story additions for expansion in parts production and assembling divisions. Bids will be asked soon on general contract. Cost over \$300,000 with equipment. Financing is being arranged through preferred stock issue.

Phillips Pump & Tank Co., Brotherton Road and Pennsylvania Railroad, Cincinnati, pumping machinery and parts, tanks, etc., has asked bids on general contract for one-story addition, 120 x 132 ft., including improvements in present plant. Cost over \$90,000 with equipment. Grunkemyer & Sullivan, 3717 Eastern Avenue, are architects.

Sunbeam Electric Mfg. Co., Read Street and Morgan Avenue, Evansville, Ind., automobile headlights and other lighting equipment, has let general contract to Bueshing Brothers Construction Co., 219 West Berry Street, Fort Wayne, Ind., for two and three-story additions, 89 x 142 ft. Cost over \$125,000 with equipment. Edwin C. Berendes, 121 Upper Fourth Street, is architect.

Bantam Bearings Corp., 3702 West Sample Street, South Bend, Ind., ball and roller bearings, etc., plans one-story addition, 73 x 75 ft. Cost close to \$40,000 with equipment. Willard M. Ellwood, Christman Building, is architect.

South Central

• **Tennessee Valley Authority**, Knoxville, Tenn., asks bids until July 15 for steel intake gate rail support towers for Kentucky dam project; hand-railing for lock at Kentucky dam. Preliminary plans are under way by Chemical Division for expansion and improvements in Federal nitrate plant No. 2, Muscle Shoals, Ala., comprising new buildings and equipment for production of ammonia and ammonium nitrate, and kindred products. Cost over \$2,000,000. Appropriation is being arranged.

Coca-Cola Bottling Co., 1538 Bank Street, Louisville, asks bids until July 16 for new two-story and basement mechanical-bottling storage and distributing plant, 200 x 250 ft., at Seventeenth and Hill Streets, with service and garage building. Cost close to \$100,000 with equipment. Jesse M. Shelton, Bona Allen Building, Atlanta, Ga., is architect.

United States Engineer Office, Second District, New Orleans, asks bids until July 16 for one crawler crane for use both with clamshell and dragline buckets, 65-ft. alloy steel boom to handle load of 6500-lb. at radius of 55 ft., not exceeding 75 per cent tipping load (Circular 533).

Southwest

• **Rearwin Aircraft & Engines, Inc.**, Fairfax Airport, Kansas City, Kan., airplanes and parts, aircraft engines, plans one-story addi-

tion for increase in parts production and assembling departments. Cost over \$50,000 with equipment.

Key Packing Co., 2100 Bremen Avenue, St. Louis, meat packer, plans expansion and improvements, including additional equipment. Cost close to \$100,000 with equipment.

Black, Sivals, & Bryson, Inc., 7500 East Tenth Street, Kansas City, Mo., pressure tanks and vessels, towers, foundry flasks, etc., has approved plans for one-story addition, 60 x 120 ft., for expansion in machine shop. Cost about \$50,000 with equipment.

Beech Aircraft Corp., Wichita, Kan., airplanes and parts, has let general contract to O. W. Armagost, 915 West Thirteenth Street, for three one-story additions on adjoining tract recently acquired, for expansion in parts production and assembling divisions. Cost over \$50,000 with equipment. Other extensions are planned in near future. Overend & Boucher, Brown Building, are architects.

Carter Carburetor Corp., 2840 North Spring Street, St. Louis, has let general contract to L. O. Stocker Co., Arcade Building, for four and one-story addition. Cost close to \$200,000 with equipment.

Carter-Gragg Oil Co., Fort Worth, Tex., affiliated with Carter Oil Co., National Bank of Tulsa Building, Tulsa, Okla., plans new gas recycling plant in Long Lake oil field, near Marquez, Leon County, Tex., with compressor station, steel tank storage and distributing facilities. Cost over \$125,000 with equipment.

Hanson-Buchanan Corp., National Bank of Tulsa Building, Tulsa, Okla., oil products, plans new bulk terminal plant at Seventh Avenue South, Texas City, Tex., with steel tanks and other facilities. Cost over \$65,000 with equipment.

Middle West

• **Automatic Engineering Works, Inc.**, 3544 West Gladys Avenue, Chicago, screw machine products, has asked bids on general contract for new one-story plant, 50 x 180 ft. Cost over \$65,000 with equipment. Sidney C. Finck, 134 North La Salle Street, is architect.

Electro-Motive Corp., La Grange, Ill., diesel locomotives and parts, has let general contract to Thorgerson & Erickson Co., 228 North La Salle Street, Chicago, for three-story and basement addition, 40 x 140 ft. Cost close to \$150,000 with machinery.

Twin Disc Clutch Co., Racine Street, Racine, Wis., power take-off units, clutches, etc., will take bids at once on general contract for one and two-story addition, about 40,000 sq. ft. of floor space. Cost over \$85,000 with equipment. Frank Hoffman, 201 Sixth Street, is architect.

Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., plans new four-story steam power house, 40 x 40 ft., at local paper mill. Cost over \$65,000 with boiler units and auxiliary equipment. Thomas Utegaard is company engineer.

Coca-Cola Co., 2035 University Avenue, S.E., Minneapolis, has let general contract to Standard Construction Co., National Building, for new two-story mechanical-bottling, storage and distributing plant, 132 x 310 ft., at St. Paul, Minn. Cost close to \$175,000 with equipment. Ernest H. Schmidt & Co., Coughlan Building, Mankato, Minn., are architects.

Chicago Metal Hose Corp., 1315 South Third Avenue, Maywood, Ill., has asked bids on general contract for one-story addition, 125 x 130 ft. Cost over \$85,000 with equipment. Hallberg & Beersman, 221 North La Salle Street, are architects; Engineering Systems, Inc., last noted address, is engineer.

Pacific Coast

• **Procter & Gamble Co.**, 1601 West Seventh Street, Long Beach, Cal., soaps, edible oils, etc., has let general contract to Duff & Vandenhoozen, 733 West Fourteenth Street, for one-story addition, 155 x 164 ft., for storage and distribution. Cost over \$70,000 with mechanical-handling and other equipment. J. H. Davies, Ocean Center Building, is engineer. Company headquarters are at Cincinnati.

Barlow Brothers, Barlow Station, Sebastopol, Cal., food canners and packers, have approved plans for one-story addition. Cost close to \$45,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, plans following expansion and improvements at Mare Island Navy Yard, for which total appropriation of about \$2,800,000 has been authorized: One-story electric equipment shop, \$400,000 with machinery; extensions, improvements and relocation of certain present shops, \$500,000 with equipment; submarine storage and service building, \$80,000; one-story addition to building No. 382 for expansion in sub-assembly facilities, \$250,000; traveling crane, \$17,000; weight-handling and transportation equipment, \$65,000, and miscellaneous work.

Board of Snohomish County Supervisors, Everett, Wash., Clarence Hickey, County engineer, plans steel hangar, with machine and reconditioning shop, 165 x 400 ft., at County airport, about six miles from city. Cost over \$100,000 with equipment. Financing in part has been arranged through Federal aid.

United States Hardware & Paper Co., 3001 East Pico Boulevard, Los Angeles, has asked bids on general contract for new one-story plant, 300 x 400 ft., in Vernon district, where site recently was acquired, to include paper-processing, storage and distribution, and other departments. Cost over \$100,000 with equipment. Marcus P. Miller, Board of Trade Building, Los Angeles, is architect.

Dow Chemical Co., 9 Main Street, San Francisco, plans expansion and improvements in plant at Pittsburg, Cal., including additional equipment. Cost over \$85,000 with machinery. Main offices are at Midland, Mich.

Canada

• **Shawinigan Chemicals, Ltd.**, Transmission Street, Shawinigan Falls, Que., has let general contract to Grant Copping Co., Fourth Street, for one-story addition. Cost over \$60,000 with equipment.

Dominion Forge & Stamping Co., Ltd., Windsor, Ont., has let general contract to Allan Construction Co., Ltd., 44 Wyandotte Street, for one-story addition, 85 x 170 ft. Cost about \$65,000 with equipment.

St. Laurence Alloys, Ltd., Canal Road, Beauharnois, Que., metals, plans one-story addition, for which bids will be asked soon on general contract. Cost close to \$60,000 with equipment.

John Inglis Co., Ltd., 20 Strachan Avenue, Toronto, has plans for ordnance plant to cost \$80,000. Company is engaged in manufacture of Bren guns for Canadian and British governments.

Cub Aircraft, Ltd., 2 Adam Street, Hamilton, Ont., has awarded contract to Canadian Engineering & Contracting Co., Ltd., 25 Hughson Street South, for airplane manufacturing plant at Civic Airport.

McKinnon Industries, Ltd., Ontario Street, St. Catharines, Ont., has awarded general contract to Newman Bros., 127 St. Paul Street, for foundry addition to cost \$50,000.

Dominion Engineering Works, Ltd., Lachine, Que., has let general contract to Hyde & Miller, 1500 Guy Street, for addition to plant to cost \$50,000.

Department of Munitions and Supply, Ottawa, has awarded contract to Redfern Construction Co., Ltd., Toronto, for aircraft assembly plant at Fort Erie, Ont., in connection with Fleet Aircraft, Ltd., to cost \$200,000.

Ford Motor Co. of Canada, Ltd., Windsor, Ont., has called for tenders for machine shop addition 570 x 192 feet. J. C. Bonham, in charge.

Canadian Car & Foundry Co., Ltd., 621 Craig Street West, Montreal, awarded contract to Cosman & Co., West Market, Moncton, N. B., for addition to plant at Amherst, N. S., to cost \$150,000.

Beauharnois Power Corp., Ltd., 107 Craig Street West, Montreal, has awarded general contract to Foundation Co. of Canada, Ltd., 1538 Sherbrooke Street, West, Montreal, for \$5,000,000 power development project at Beauharnois, Que.